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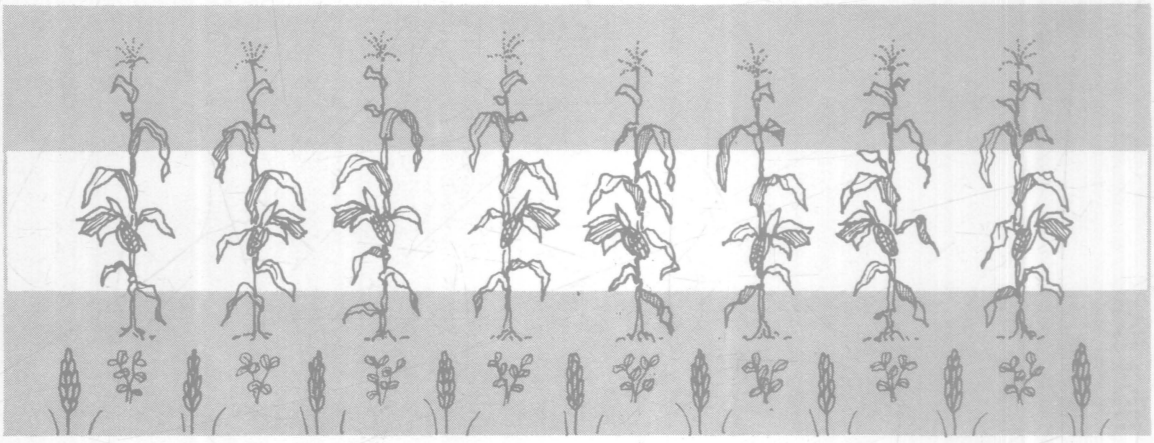
PESTICIDE USE ON MAJOR CROPS IN THE NORTH CENTRAL REGION . . . 1978



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in cooperation with

State Pesticide Impact Assessment Program Liaison Representatives

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Pesticide Use on Major Crops In The North Central Region

by
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Introduction

The use of pesticides in agricultural production in the states of the North Central Region has been a major factor in enabling farmers to become more efficient in producing an increasing quantity of quality food, feed, and fiber crops from a gradually declining acreage.[2/] Predictions for the future indicate that chemical pesticide use will remain an important part of agricultural technology as farmers are expected to maintain and even improve that production to continue providing food for the population of the United States in the manner to which they have become accustomed and at the same time assume an even greater increase in helping to feed the nations of the world. Quantities of pesticide chemicals used by farmers in the North Central Region have increased tremendously during the past two decades. Acreages treated with herbicides increased by 315 percent from 1964 to 1978 and insecticide-treated acreages increased 266 percent during that period.

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[2/] As indicated in the book "The Farm & The City - Rivals or Allies" 1980, edited by Archibold M. Woodruff, in 1975 the annual loss of prime farm land in the United States was approximately 5 million acres per year due to urbanization, "leapfrog development" associated with urbanization, and covering with water. In the North Central Region the Corn Belt lost approximately 1,375,000 acres between 1967 and 1975, the Northern Plains States approximately 510,000 acres, and the Lake States approximately 450,000 acres for a total of approximately 2,335,000 acres or 291,875 acres per year over an eight-year period.

The quantities of herbicides applied to corn, soybeans, and wheat increased 480 percent from 1966 to 1976 and quantities of insecticides by 170 percent on those crops during that period.[3/] Wise use of these chemical agents has enabled the farmer to increase his production, improve the quality of his produce, and promote economic benefits to the consuming public as well as to himself. However, the application of vast quantities of pesticide chemicals has also been associated with some environmental hazards which has resulted in the current intensive review of their registration and use.

In the registration process utilized by the Environmental Protection Agency (EPA), who is mandated by Congress to regulate the registration and consequent use of agricultural chemicals in accordance with safe practices, those pesticides that could possibly cause "unreasonable adverse effects" to man and/or his environment are subjected to an intensive review of their benefits versus the risks. This process is known as RPAR or Rebuttable Presumption Against Registration of the pesticide. These reviews are generally triggered by a risk assessment from which a judgement is made that acute toxicity; chronic toxicity; reduction in populations of wildlife, endangered species, and non-target species; and lack of emergency treatment or antidote exceeds a level that EPA has defined as being acceptable by society. Under this program the United States Department of Agriculture, charged with the responsibility to provide benefits/use data, organized the National Agricultural Pesticide Impact Assessment Program (NAPIAP) with Pesticide Assessment Teams and special research efforts designed to provide the data required for a proper benefit/risk evaluation. The organization of NAPIAP on a regional basis and

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[3/] "The Pesticide Review 1966", Table 12, USDA-ASCS and Table 1 of this publication; and "The Farm Pesticide Industry" Agr Econ Rept No 461, USDA-SEA-ESCS, 1980 Tables 5 and 6.

subsequently at the state level provides a coordinated effort making it possible to obtain the research data needed to fill voids and/or confirm the needs and benefits of the pesticide in question in the relatively short period of time permitted.

The Technical Committee of the North Central Region Pesticide Impact Assessment Program (NCRPIAP) recognized early in the program that a vital information void existed in knowledge of the quantity and the identity of the pesticides that were actually being used by the farmers in their agricultural production. If the need for a particular pesticide and the benefits of its use are to be properly evaluated in the RPAR process, then factual data is needed. Confirmation by the Technical Advisory Group (TAG) of NAPIAP but the infeasibility in 1978 of implementing a National Pesticide Use Survey Program resulted in a decision by NCRPIAP to conduct such a survey in the 12 North Central States. Such a survey had to be coordinated in order to provide individual state level data and yet be statistically sound in relating the usage to the entire North Central Region. Consequently, a survey questionnaire and reporting procedure was developed from which each state could develop compatible sampling and analytical procedures which would result in an aggregation of local, state, and regional usage information. Each state conducted the survey independently following the guidelines specified while also employing the protocols related to the particular agency(s) involved. In most cases the services of the State Crop and Livestock Reporting Service were contracted. States had the option to include in their survey any related items of local interest in addition to the required coordinated CORE information.

The survey was designed to cover those crops classified as "major field crops" of major economic importance in the states where grown or those crops for which the states involved account for a major portion of agricultural production. Some crops were common to all states; other crops had major economic importance in only a few states. It was decided that the only way to get the needed information was to ask individual farmers to report the identity and quantity of pesticide chemicals used - either by pounds of active ingredient or amount of specified formulation, the number of applications, and number of acres planted and treated for each crop specified.

Procedures

Survey planning started in April 1978 with approval of the project in four states. The study was expanded to all 12 states in June 1978. All states were asked to use a correlated survey questionnaire or a similar state vehicle that, after review and approval by the Agricultural Statistician spearheading the effort for NCRPIAP (Earl L. Park), would accomplish the same objectives. (See Apendix I). The intent was to conduct the survey late in 1978 after the harvest was completed or early in 1979. The NCRPIAP Committee asked that the Experiment Station in each state utilize the services of the State Crop and Livestock Reporting Service to coordinate or conduct the survey in whole or in part so as to ensure reliable survey results. In the majority of states this was done but in some it was not possible. The actual timing of the survey varied among the states depending somewhat upon their internal workload and the scheduling at a time to avoid conflicts with other crop or farm surveys normally conducted or a busy work period of the year for the farmer. However, all data collected was to be related to the 1978 crop year.

The sample of farmers selected randomly in each state was established at a sufficiently large number, considering the normal expected level of response, to provide statistically sound data (See individual state publications). The survey was conducted initially in all states except South Dakota by mailing the questionnaires to the farmers selected in the sample. In South Dakota the survey was conducted exclusively by telephone contact. A second mailing was made to those farmers who did not respond to the first inquiry. Where it was deemed necessary, after the response from the second mailing was received, several of the states selected a subsample of non-respondents who then were contacted by telephone. Survey questionnaires were edited by personnel in the State Crop and Livestock Reporting Services and/or by University personnel. The tabulated state data was then submitted to Earl Park at Purdue University for computation of regional totals. Each state also published their individual state survey results.

Results and Discussion

Acreage Treated with Pesticides

Survey response was obtained from over 39,000 farms representing approximately 4 percent of the total farms in the 12-State Region. The percent of farmer response to the questionnaire with usable data was fairly consistent for each state, providing a reliable regional data base.

Acreage planted to major field crops in the North Central Region in 1978 totaled 194,307,700 acres with an additional 106,893,400 acres reported in pasture and managed rangeland. Approximately 66 percent (127,791,000 acres) of the cropland was treated with herbicides, 20.1 percent (38,990,100 acres) with insecticides and 4.3 percent (8,388,600 acres with fungicides and other chemicals (Table 1). Fungicide use was largely attributed to acreage planted

with treated seed rather than treatment of soil or standing crop. Other chemicals included rodenticides, avicides, desiccants, etc. and those not otherwise identified. The acreage of pasture and rangeland treated with pesticide chemicals was considerably less, amounting to approximately 5.0 percent on 5,357,600 acres for weed control and relatively insignificant percentages for insect and disease control (Table 2). The data reported for insect and disease control on pastures and rangeland was not complete for all states.

Approximately 93 percent of the corn acreage in the 12-State Region, 58.6 million acres, and 95 percent of the spybean acreage, 36.9 million acres, were treated with herbicides (Table 3). In comparison to surveys that were conducted in a few states in 1970, this data indicates a significant increase in the percent of acreage being treated. For example, in Indiana the 1978 herbicide usage on 97.8 percent of the corn acreage and 95.6 percent of the soybean acreage compares to the 1970 usage on 84.8 and 70.9 percent respectively. For all major crops in Indiana, the herbicide usage increased from 64.4 percent of the total acreage in 1970 to 81.6 percent in 1978. Similarily, in Michigan the increase in herbicide usage on corn was from 91.0 to 96.6 percent of the acreage and from 63.5 to 95.7 percent of the soybean acreage over the eight-year span. For all major crops the increase was from 47 percent in 1970 to 67 percent in 1978. This increase in herbicide use, although only reported for the two states, is probably indicative of the trend throughout the Region.

Of the other major crops common to all 12 states, herbicides were applied to 44 percent of the wheat acreage, 41.7 percent of the other small grains (barley, oats, and rye) acreage, 1.4 percent of the alfalfa hay acreage, and 1.0 percent of the other hay acreage (Table 3). The application of insecticides

and fungicides to major crops was relatively limited except for 7.7 percent of the alfalfa hay acreage being treated, probably for control of weevil and/or potato leafhopper, and 16.3 percent of the wheat acreage being treated with fungicides, with most of that involving acreage planted with fungicide-treated seed (Table 3).

Table 3 also provides a summary of treated acreage for other crops that were considered major only in a few of the states and for cotton reported only from Missouri, and potatoes only from North Dakota. Approximately 95 percent of the sugarbeet and dry bean acreage in the states indicated, 83.7 percent of the sunflower acreage, 74.4 percent of the sorghum acreage, 51.0 percent of the flax acreage, and 43.7 percent of the tobacco acreage were treated with herbicides. Weed control with herbicides in Missouri cotton was utilized on 99 percent of the acreage. While insecticides and fungicides on major crops common to all states were used on only a small percentage of the planted acreage, their use on special major crops of a few states covered a high percentage of the planted acreage. In North Dakota, insecticides were applied to 90.8 percent of the potato acreage and fungicides to 54.5 percent. In Missouri, insecticides were used on 54.8 percent of the cotton acreage and fungicides on 38.6 percent. From the states that reported tobacco production, insecticides and fungicides were applied to 39.2 and 49.0 percent of the acreage, respectively, whereas sugarbeets were treated for insect control on 29.5 percent and for disease control on 15.6 percent of the acreage. Approximately 31 percent of the sorghum acreage received insecticide treatment. The use of insecticides or fungicides on other special major crop acreage was quite limited. Comparison of insecticide use in Indiana and Michigan between 1970 and 1978, which may be indicative of the Region, also indicated an increase from 37 percent to 47 percent of the corn acreage in Indiana and from 12.5 to 47.2 percent in Michigan being treated. On all major crops in Michigan, insecticide use

increased from 12.6 to 24.4 percent of the acreage over the eight-year span. Most of that increase was attributed to corn and actually a decrease was evident in wheat and small grains, all hay and dry beans. The use of fungicides on major crops, except for the data noted above on some crops, is still quite limited in the North Cetral Region.

Some differences are noted in the total acreages reported in Table 3 with the totals in Tables 1 and 2. The data in Tables 1 and 2 are a summation of the acreage data as reported by states for all land in major crops whereas Table 3 is a summary of the data as tabulated by individual crop.

Tables 4 through 10 provide the data on acreage treated with herbicides, insecticides, fungicides, and other control agents by crop and state. It can be noted that the percent of corn acreage treated for weed control seems to be fairly consistent between states with the exception of North Dakota, South Dakota, and possibly Kansas. There is some variation between the states in the percent of corn acreage treated with insecticides with the greatest difference from the regional average being North Dakota and South Dakota at 4.2 and 11.7 percent and Kansas at 81.3 percent. Herbicide-treated acreage for soybeans seems to be consistent between the states except for a significantly lower percentage usage in South Dakota (66.3) and Kansas (78.4). The largest acreage percentage use of herbicides in wheat occurred in North Dakota, Minnesota, and South Dakota at 88.2, 97.4, and 61.6 percent, respectively, whereas for other small grains, Michigan is included with the three above at 69.7, 61.0, 43.7, and 49.8 percent, respectively. However, Kansas with the largest wheat acreage in the Region and also Nebraska, Ohio, Missouri, and Indiana with wheat acreages of near one million or more reported 10 percent or less of that acreage being treated for weed control. It thus appears that the weed problems in wheat in the three most northern states are considerably

different than in the other wheat producing states of the Region. Infestations of wild oats in those three states may be a major factor. A somewhat similar trend seems to be prevalent in the other small grain crops also. The need for insecticides and fungicides on the wheat and small grain crops in the North Central Region appears to be quite limited in relation to the percent of acreage planted.

Over 180,000 acres of alfalfa were treated with insecticides in each of five states (Illinois, Ohio, Michigan, Missouri, and Wisconsin). Although the total treated acreage for each of those states is fairly consistent, the percent of the crop acreage treated is variable. As indicated in Table 8, of the total acreage, 232,800 acres (19.1 percent), 191,000 acres (32.3 percent), 188,000 acres (17.4 percent), 187,000 acres (34.0 percent) and 180,000 acres (4.0 percent) were treated in those states, respectively. Other states where acreage treated exceeded 100,000 were Nebraska with 160,000 or 11.6 percent and Kansas with 139,500 or 13.3 percent. By contrast, farmers in Minnesota and South Dakota, the next two largest alfalfa producers following Wisconsin, applied very little insect control chemicals which is probably a reflection of the insect pest problems in 1978.

The percent of acreage of specialty type major crops treated for pest control is recorded in Table 10. Nebraska had the largest percentage of sorghum acreage (87.4 percent) treated with herbicides, but farmers in Kansas treated almost twice the number of acres (3,249,600) which only accounted for 69.1 percent of the total. However, Kansas farmers treated a larger percentage of the sorghum acreage (39.6 percent) for insect problems than did those in Nebraska (24.9 percent). Use of herbicides in sugarbeets in the four states reporting was consistent at 93.4 to 100.0 percent, but the use of insecticides

in North Dakota and Minnesota with 41.1 and 35.5 percent of the acreage treated, respectively, was much higher than for Michigan and Ohio. Minnesota farmers experienced the major need for fungicides or other pest control use in sugarbeets with 20.0 percent of the acreage being treated. Ther percent of tobacco acreage treated with herbicides and insecticides was fairly comparable between the three reporting states, but the use of pesticides for disease or other pest control on 69.7 percent of the acreage in Ohio was considerably more than either of the other two states with about 48 percent of the total acreage being treated. The majority of use in Ohio involved the use of maleic hydrazide for sucker growth control and perhaps some weed control Michigan producers treated 550,000 acres of dry beans (96.5 percent) for weed control whereas in North Dakota the herbicide treatment on 91,300 acres constituted 87 percent of the total. The percent of flax acreage treated with herbicides in North and South Dakota was fairly consistent at 48.4 and 41.1 percent, respectively. However, Minnesota producers treated 78.6 percent of the flax acreage with herbicides. By contrast, in the sunflower acreage Minnesota and North Dakota compared favorably with 84.8 and 88.5 percent of the acreage treated with herbicides and 6.6 and 5.6 percent, respectively, treated with insecticides. In South Dakota, on the other hand, only 35.3 percent of the sunflower acreage was treated with herbicides but 15.5 percent of the acreage with insecticides. The variations in acreage treatments are probably a reflection on variation in pest problems between the states even though in some respects the growing conditions, etc. might be similar.

Quantities of Pesticides Used on Crop Acreages

In 1978 the 12 states of the North Central Region reported 278,675,800 pounds of herbicide active ingredient applied to 216,078,000 acres of major cropland, pasture, and rangeland (Tables 41 and 42). The total acreage

reported includes multiple acreage treatment in contrast to the 133,148,700 acres reported in Tables 1 and 2, which does not reflect multiple application over the same acreage. By comparison, farmers used 42,154,500 pounds active ingredient of insecticides on 44,132,800 acres including multiple acreage treatment (Tables 43 and 44). Fungicide data, although apparently incomplete, indicated approximately 520,200 pounds active ingredient applied to up to 5,670,100 acres (Table 45) with a large percentage of the acreage involving planting with treated seed (See notes d and f from Table 45). Other chemicals amounting to 75,100 pounds active ingredient were applied to 73,600 acres (Table 45). However, the majority of this (41,800 pounds applied to 48,700 acres) was attributed to the use of paraquat as a desiccant for soybeans.

Reference to specific pesticides in the following paragraphs and the associated tables is by common name only. A glossary of the common names with cross reference to the familiar trade names of products used by farmers answering the questionnaires is found in Appendix II.

Herbicide Use Related to Crops and Acreage

The herbicide used in the greatest quantity in the North Central Region was alachlor (74,374,600 pounds of active ingredient used on 39,799,700 acres, Tables 41 and 42). Approximately 63.3 percent of the alachlor reported (47,133,500 pounds) was used on 24,655,000 acres of corn and 36.6 percent (27,187,200 pounds) was applied to 15,098,000 acres of soybeans (Tables 11, 13, 26, and 28). The balance of the alachlor use was on sorghum, dry beans, and sunflower (Tables 22, 23, 25, 37, 38, and 40). Atrazine, however, was used on more acreage than any other herbicide with 41,393,000 acres treated with 57,145,700 pounds active ingredient (Tables 41 and 42). Approximately

93.5 percent of the atrazine used accounting for 53,456,800 pounds was used on 37,396,400 acres of the corn (Tables 11 and 26). Smaller quantities accounting for the remaining 6.5 percent were applied to soybeans, wheat, other small grains, other hay, pasture, and sorghum (Tables 13, 15, 16, 18, 19, 22, 28, 30, 31, 33, 34, and 37). Butylate was used on 11,955,300 acres of corn amounting to 37,483,300 pounds active ingredient (Tables 11, 26, 41, and 42). Over 85 percent of the 19,596,800 pounds of trifluralin active ingredient (16,782,500 pounds) was used on 17,374,200 acres of soybeans (Tables 13, 28, 41, and 42) and the balance used on corn, wheat, other small grains, sugarbeets, dry beans, flax, and sunflower which for some crops may have been used in a single state only (Tables 11, 15, 16, 21, 23, 24, 25, 26, 30, 31, 36, 38, 39, and 40).

The next four herbicides, categorized in either quantities of active ingredient used or acreages to which applied of over 10 million, were 2,4-D (17,050,600 pounds applied to 30,000,100 acres), cyzanazine (15,970,800 pounds applied to 9,728,900 acres), propachlor (10,709,500 pounds applied to 4,520,500 acres) and metribuzin (7,443,100 pounds applied to 14,808,300 acres). The distribution of these herbicides as well as all others relative to crop, acreage, quantities, and the state where used, can be determined by reference to the appropriate tables of this report. State reports identified 69 different herbicides used in significant amounts and/or on significant acreages of major crops. As the tables indicate, some herbicides have usage in all states while others were representative of only certain states. This phenomenon was not necessarily associated exclusively with the reporting of usage on crops not common to all states. In some of the crop acres common to all states, different weed problems undoubtedly led to selection of particular

herbicides that may not have been commonly used in other states. However, the major corn herbicides such as alachlor, atrazine, butylate, cyanazine, 2,4-D, and dicamba were used in significant amounts in all states with EPTC, metolachlor, and propachlor being used in most states. Likewise for soybeans, all states reported significant use of alachlor, chloramben, metribuzin, and trifluralin with bentazon and linuron being used in all states except South Dakota and profluralin in all states except Michigan and South Dakota. The compilation of state data to prepare this regional publication did not include the identification of pest problems in each state and associated with each crop. Thus for that information and the consequent correlation of why certain pesticides were used on certain crops in each state, the reader is referred to the individual State Bulletins.

On a crop by crop basis, the major herbicides by pounds active ingredient used on crop acreages were as follows: Corn - atrazine, alachlor, butylate, cyanazine, and 2,4-D as reported above (Tables 11 and 26). Soybeans - alachlor, trifluralin, and metribuzin as reported above plus 5,862,500 pounds of chloramben on 5,662,500 acres and 4,043,600 pounds of linuron on 6,075,400 acres (Tables 13 and 28). Wheat - 4,924,300 pounds of 2,4-D on 11,627,900 acres (Tables 15 and 30). Other small grains - 1,731,900 pounds of 2,4-D on 4,032,500 acres and 809,400 pounds of MCPA on 2,241,700 acres (Tables 16 and 31). Alfalfa - 63,100 pounds of simazine on 55,800 acres (Tables 18 and 33). Pasture and Rangeland - 5,553,800 pounds of 2,4-D and 1,479,100 pounds of 2,4,5-T on 4,291,000 and 887,000 acres, respectively, mostly attributed to use in Kansas (Tables 19 and 34). Tobacco - 8,900 pounds of benefin on 8,900 acres on Ohio and Wisconsin (Tables 20 and 35).

Sugarbeets - 1,075,900 pounds of EPTC on 307,800 acres mostly in Minnesota and North Dakota (Tables 21 and 36). Sorghum - 5,924,100 pounds of propachlor and 3,532,700 pounds of atrazine on 2,306,300 and 3,863,800 acres, respectively, with the majority of usage in Kansas (Tables 22 and 37). Dry beans - 736,400 pounds of trifluralin and 360,600 pounds of EPTC on 403,100 and 497,900 acres,respectively, with Michigan accounting for 90 percent of that use (Tables 23 and 38). Flax - 191,100 pounds of dalapon; 85,200 pounds of EPTC and 63,400 pounds of MCPA on 71,900; 38,300 and 296,400 acres, respectively (Tables 24 and 39). Sunflower - 1,580,900 pounds of trifluralin and 899,500 pounds of EPTC on 1,883,500 and 367,800 acres, respectively, with the major use attributed to North Dakota (Tables 25 and 40). As indicated in the State Survey Bulletins, the major herbicides used in North Dakota for potato production were 39,700 pounds of EPTC and 7,000 pounds of diallate applied to 13,100 and 7,000 acres respectively, and for cotton production in Missouri, 124,000 pounds of trifluralin; 105,000 pounds of MSMA and 89,000 pounds of fluometuron on 177,000 acres; 131,000 acres; and 150,000 acres, respectively.

Insecticide Use Related to Crops and Acreage

Approximately 70 percent of the insecticides used for major crops in the North Central Region in 1978 with application to over 75 percent of the reported acreage can be attributed to four chemicals - carbofuran, fonofos, phorate, and terbufos - with over 97 percent of the poundage being used for corn. As indicated in Tables 43 and 44; 9,454,500 pounds active ingredient of carbofuran; 8,948,000 pounds of fonofos; 4,977,900 pounds of phorate and 8,416,400 pounds of terbufos were applied to 10,199,300; 8,321,300;

4,611,200; and 7,582,300 acres of cropland, respectively. Another 14.5 percent of the poundage and 11.2 percent of the acreage reported for insecticide use can be attributed to five additional chemicals: carbaryl - 1,624,400 pounds on 1,312,200 acres, chlorpyrifos -1,138,500 pounds on 984,800 acres, ethoprop - 980,900 pounds on 945,000 acres, parathion -784,500 pounds on 1,033,200 acres, and toxaphene - 1,563,700 pounds on 664,900 acres. Forty-five different insecticide chemicals were reported by name with significant use in the North Central Region. Some states reported the combination products, Alfa-tox^{R} (diazinon and methoxychlor) and M & M^{R} (malathion and methoxychlor) as related to the components whereas others reported the product use.

The major insecticides by pounds active ingredient used on crop acreages were as follows: Corn - carbofuran, fonofos, phorate, and terbufos as indicated above (Tables 12 and 27). Soybeans - 139,400 pounds of carbaryl and 66,800 pounds of toxaphene on 152,200 and 43,400 acres, respectively (Tables 14 and 29). Wheat - 351,400 pounds of toxaphene on 125,600 acres (Tables 15 and 30). Other small grains - 36,200 pounds of toxaphene and 28,600 pounds of carbaryl on 66,700 and 32,200 acres, respectively (Tables 16 and 31). Alfalfa - 219,500 pounds of carbaryl; 217,700 pounds of malathion; 144,300 pounds of carbofuran and 128,500 pounds of parathion on 186,700; 107,400; 222,800; and 144,900 acres, respectively (Tables 17 and 32). Other Hay - 76,200 pounds of Alfa-tox^{R}; 71,700 pounds of M & M^{R}; 67,400 pounds of carbaryl and 42,900 pounds of malathion on 39,600; 90,800; 102,800; and 32,100 acres respectively (Tables 18 and 33). Pasture and rangeland - 130,100 pounds of malathion; 51,400 pounds of carbaryl and 38,600 pounds of toxaphene on

130,000; 25,600; and 15,300 acres, respectively (Tables 19 and 34). Tobacco - 7,700 pounds of carbaryl on 4,100 acres (Tables 20 and 35). Sugarbeets - 83,800 pounds of aldicarb; 61,400 pounds of terbufos; and 57,900 pounds of fonofos on 58,900; 53,600; and 46,500 acres, respectively (Tables 21 and 36). Sorghum - 480,400 pounds of disulfoton; 395,500 pounds of toxaphene; 328,500 pounds of parathion; 311,600 pounds of carbaryl; 278,700 pounds of phorate; and 163,900 pounds of carbofuran on 496,600; 125,000; 434,100; 165,700; 270,500; and 192,400 acres, respectively (Tables 22 and 37). Dry beans - 14,000 pounds of disulfoton on 16,000 acres in Michigan (Tables 23 and 38). Sunflower - 72,400 pounds of toxaphene on 64,600 acres (Tables 25 and 40). North Dakota reported that the major insecticides used on potatoes were 108,900 pounds of azinphos-methyl on 72,800 acres; 58,300 pounds of phorate on 26,000 acres; 50,800 pounds of disulfoton on 21,300 acres; 27,900 pounds of aldicarb on 9,400 acres; 24,900 pounds of endosulfan on 11,100 acres and 22,300 pounds of phosphamidon on 9,100 acres. Missouri did not report specific insecticide use on cotton, but indicated a total of 7800 pounds of insecticide active ingredient used on 152,000 acres.

Fungicide Use Related to Crops and Acreage

As indicated earlier, the use of fungicides and other chemicals on major crops in the North Central Region was quite limited with the majority of the acreage reported involving plantings with treated seed rather than application to the soil or standing corp. For example, almost all of the 5,700,100 acres of wheat that was reported as fungicide treated was attributed to treated seed but yet this accounted for only approximately 15 percent of the planted acreage. Also only approximately 2 percent of the soybean acreage, 2.5 percent of the small grain acreage, and less than 1 percent of

the corn acreage were treated with fungicides. The major uses of specific fungicides on certain major crops was reported as follows: Soybeans - 11,900 pounds of benomyl and 9,000 pounds of thiram applied to 16,300 and 28,600 acres mostly in Indiana and Ohio (Tables 14 and 29). Sugarbeets - relatively small quantities of four fungicides (benomyl, mancozeb, thiobendazole, and triphenyltin hydroxide) in quantities from 800 to 1,700 pounds applied to 700 to 2,700 acres except 8,100 acres for triphenyltin hydroxide (Tables 21 and 36). Dry beans - 21,900 pounds of maneb and 8,400 pounds of mancozeb on 12,900 and 3,000 acres, respectively in North Dakota (Tables 23 and 38). The major fungicide use on potatoes in North Dakota was 84,300 pounds of mancozeb on 38,300 acres; 11,700 pounds of triphenyltin hydroxide on 22,900 acres; and 11,700 pounds of captafol on 5,000 acres. Missouri did not list specific fungicides used on cotton, but indicated 88,000 pounds used on 81,000 acres.

Other Chemical Use on Major Crops

As shown in Table 45 and discussed previously, the major chemical use in this category was 41,800 pounds of paraquat used on 48,700 acres mostly as a desiccant to kill crop vines. In addition, 28,000 pounds of maleic hydrazide was used on 7,600 acres of tobacco mostly in Ohio (Tables 20 and 35).

Safety Factors in Pesticide Use

Additional data were collected with the use survey to determine attitudes and practices of farmers relative to some of the principles of safety in pesticide use. All states did not respond equally to this part of the questionnaire, but data was collected generally from 9 or 10 states depending

upon the item. Reference should be made to the individual State Survey Bulletins relative to that repsonse. Although the data cannot be correlated to label directions that specify certain protective measures to be used when handling and applying each individual pesticide, indications were that 16 percent of the farm operators used respirators, 12 percent used waterproof or other designated protective clothing, 46 percent used rubber gloves and boots, 24 percent used eye protection, and 23 percent had enclosed cabs on the tractor that provided protection during application (Table 46). Future surveys of this type should address the issue of relating the use of protective clothing and devices to the compliance with label directions for use of the particular toxicity class, formulation, and other determining factors of the pesticides. It could thus be assumed that, for instance, the reported 16 percent of the operators who used respirators is representative of a much smaller portion of the farmer sample. Consequently, the actual evaluation would indicate that a much larger percentage of operators are complying with the requirements of wearing a respirator as related to the particular pesticides.

Of the 10 states that reported, 57 percent of the farm operators were certified pesticide applicators. Five percent indicated there were possible water contamination problems on or from their farms associated with pesticide application. Only 3 percent of the farms used irrigation and only 2 percent of the operators applied pesticides through an irrigation system (Table 47). Forty-five percent of the farmers reported using a regular flat fan nozzle for pesticide application, 26 percent used a flood jet or flooding fan nozzle, 10 percent used a hollow cone, 8 percent used a solid cone, and 7

percent used an even flat fan nozzle (Table 49). The selection of nozzles probably has direct relationship to the type of operation and the application equipment used.

In the states where such data was collected, 35 percent of the operators disposed of empty pesticide containers by burning them on the farm premises, 33 percent buried containers on the farm, 26 percent used the facilities of the landfill or dump, and 3 percent indicated containers were sometimes reused on the farm. Nineteen percent of the operators indicated other procedures of container disposal including puncturing to preclude re-use, recycling to the dealer/manufacturer, or scrap collection company, and all other means of disposal (Table 48). In the disposition of empty pesticide containers, the operator is sometimes influenced by the size and type (paper, cardboard, metal, plastic, etc.) of container and perhaps by the toxicity and nature of the contents. Interpretation of the data must consider that some operators undoubtedly used more than one method of pesticide disposal, hopefully in compliance with directions for the specific pesticides being used.

Other Pesticide Use Information

Reference to the pesticide use survey form (Appendix I) indicates that information was also collected on the types of pesticide formulations used for the different pest targets on different crops, the methods and rates of pesticide application, the percent of pesticides applied by the farmer versus the commercial applicator, and the principal target pests involved. Data was also organized by some states related to the reporting districts within the states. Because of some diversity in the manner in which that information was reported by the various states and the fact that all states may not have

all such data, a tabulated regional summarization was not attempted. The reader is referred to the individual State Pesticide Use Survey Bulletins for the details of that information. Some general comments from perusal of the State Bulletins may, however, be in order.

The compilation and interpretation of the data tabulated in this publication could very possibly lead to an erroneous conclusion if one were to attempt the calculation of acre treatment (acres treated x times applied) or rates per acre treatments. It is also recognized that the summation of acres treated with a class of pesticides (herbicides, insecticide, etc.) may cause a double counting problem in some cases because more than one pesticide may have been applied to the same acreage. Reference to this fact has been given previously in this text in explaining the apparent difference in acreage totals between certain tables that, at first glance, appear to be reporting the same data.

It is evident from the State Bulletins that the methods of application were dependent to a large extent on the cropping practices, the acreage involved in individual farmer operation, and the nature of the pesticide application. Data indicated that the majority of pesticide application was done by the farmer-operator although commercial applicators were involved in a significant percentage of the business. The majority of the pesticides were soil incorporated which is a reflection of the cultural practices of the major crops involved and the prevalent pest problems. However, there was a significant amount of aerial application reported by some of the states which was also generally associated with commercial application.

Some State Survey Bulletins included information on the major and specific pest problems for which farmers selected certain pesticides while others only referred in general to the major pests. Also where some states

identified specific weeds, others only reported the use of herbicides for broadleaf or grass weed control. Thus, only a brief and general summary in this publication is feasible. For some crops the weed and/or insect problem was common across the Region whereas in others the problem may have related only to a few of the states reporting. Most states reported the major weed problems in corn as being broadleaf and grass weeds although in Kansas, Missouri, North Dakota, Ohio, and Wisconsin, for instance, foxtail was listed as a major specific weed problem along with thistles, shattercane, velvetleaf, fall panicum, and nutsedge for certain of those states. Across the North Central Region the major insect pest reported in corn was rootworm followed by cutworm and corn borer. Wireworm was reported as significant problem in North Dakota and Ohio. In addition to the general categorization of broadleaf and grass weeds as problems in soybeans, foxtail, pigweed, cocklebur, shattercane, velvetleaf, and lambsquarter were identified by some states. In states west of Indiana, the major insect pest reported was grasshoppers, Indiana reported problems with the Mexican bean beetle, whereas Ohio indicated Japanese beetles and green cloverworms as major insect pests.

In the wheat and small grain corps, wild oats was indicated as a problem in the northwest section of the region. Thistles, ragweed, wild mustard, foxtail, pigweed, and several others were identified as problems in some states in addition to the general categorization of broadleaf and grasses. The major insect pests identified common to most of the region were grasshoppers and armyworms except in Ohio where cereal leaf beetle was of major concern, in North Dakota where cutworms and aphids were of concern along with grasshoppers, and in South Dakota where greenbug or aphid control was necessary in some locations but grasshoppers were the major concern.

Alfalfa weevil was the major insect pest reported for alfalfa by all states supplying this data in the region. Potato leafhopper was also reported as a significant pest in Ohio and Illinois and grasshoppers were of concern in the western part of the region. The spittlebug was reported for significant acreage treatment in Indiana and Ohio on other hay crops. In addition to the general term of breadleaf and grass weeds, particular mention was made of foxtail thistle, pigweed, velvetweed, kochia, and leafy spurge as problems in some states. Most of the pest control practices in pasture management involved thistle control along with problems of multiflora rose, sagebrush, and leafy spurge in those states where such growth is common, and grasshopper control. Insect problems reported for sorghum usually included rootworms, greenbugs, and grasshoppers with Kanses also reporting seed corn beetle, wireworms, and chinch bugs as typical problems. Weed control generally included those types indicated previously for the states involved. Hornworms and budworms were reported as common to Ohio and Indiana in tobacco production whereas cutworms were reported by Wisconsin and Ohio. Wisconsin also reported some problems with aphids and Ohio reported flea beetle and wireworms. Herbicide treatments in tobacco included crabgrass, pigweed, velvetleaf, quackgrass, and foxtail in addition to other broadleaf and grass weeds common to the locality.

The major weed and insect problems in the remainder of the specialty major crops were reported only by North Dakota except for flax where South Dakota also provided information. In flax the major insect for control was the grasshopper. For sugarbeets, North Dakota indicated a maggot infestation; for dry beans, grasshoppers were of concern; for potatoes, the potato beetle, leafhopper, and aphid caused concern; and for sunflower, weevils, moths, and

cutworms in addition to grasshoppers were treated with insecticides. The weed problems in these crops were related of course to the area of cultivation with wild oats, foxtail, thistles, and other broadleafs generally treated with herbicides.

As indicated previously, we have not attempted to give a detailed analysis of the crop-pest-pesticide relationships in the North Central Region because of the impracticability of doing so at this time and the diversity of information that is perhaps state related and/or reflects the preferences of farmers associated with a certain locality. Another factor could be the availability of certain pesticide chemicals to certain localities which partially controls the farmer's choice of chemical agents. Some of these relationships can be determined by reference to the individual state reports and we again refer the reader to that source of information.

TABLE 1. Acreage Planted to Major Crops Treated With Pesticides, 1978.[a/]

State and Region	Total Planted Acres	Pesticide Treated Acres					
		Weed Control	Insect Control	Disease & Control of Other Pests	Weed Control	Insect Control	Disease & Control of Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
Illinois	22925.0	19860.6	7589.2	901.9	86.6	33.1	3.9
Indiana	12300.6	10034.3	3085.5	187.5[b]	81.6	25.1	1.5
Iowa	25200.0	20461.3	6870.4	51.5	81.2	27.3	2.0
Kansas	20350.0	7115.3	4029.2	3905.8[c]	35.0	19.8	19.2
Michigan	6523.0	4300.5	1569.5	117.5	66.9	24.4	1.8
Minnesota	21465.0	15838.0	2548.0	172.0	73.8	11.9	0.8
Missouri	12978.0	8749.0	1810.0	324.0	67.4	14.0	2.5
Nebraska	15308.0	9690.0	5736.0	774.0[c]	63.3	37.5	5.1
North Dakota	20594.2	13933.0	724.6	1188.7[c]	67.7	35.2	5.7
Ohio	11520.4	7739.1	2176.0	175.3	67.2	18.9	1.3
South Dakota	15795.0	5928.7	592.0	494.3[d]	37.5	3.7	3.1[d]
Wisconsin	9348.1	4145.6	2259.2	96.1	44.3	24.2	1.0
Reported Region Total	194307.7	127791.1	38990.1	8388.6	65.8	20.1	4.3

a/Major crops excluding pasture and rangeland.
b/Total includes 179,000 acres disease control and 9,000 acres other control.
c/Wheat acreage planted with treated seed. Includes 774,000 acres in North Dakota.
d/Includes treatment not specified involving use of herbicides, insecticides, fungicides, and other pesticides.

TABLE 2. Acreage and Percent of Pasture and Rangeland Treated With Pesticides, 1978.

State	Acres 1978	Planted Acreage Treated For Control of:			Percent of Acreage Treated For Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
Illinois	1540.2	79.1	19.9	1.3	5.1	1.3	0.1
Indiana	2880.0	50.1	10.5	b	1.7	0.4	b
Iowa	4260.0	494.2	8.5	b	11.6	0.2	b
Kansas	21078.0	2581.9	b	b	12.5	b	b
Michigan	a						
Minnesota	5000.0	100	b	b	2.0	b	b
Missouri	12900.0	413	39.0	28.0	3.2	0.3	0.2
Nebraska	14038.0	978	209.0	b	7.0	1.5	b
North Dakota	11767.6	235.4	0.0	0.0	2.0	0.0	0.0
Ohio	2600.0	55	5.0	b	2.1	0.2	b
South Dakota	26786.0	305.9	46.3	76.8[c]	1.1	0.2	0.3[c]
Wisconsin	4043.0	65.0	2.0	f	1.6	0.1	f
11 State Total	106892.8	5357.6	340.2[e]	106.1[d]	5.0	0.3[e]	0.1[d]

a/Crop not included in survey report.
b/Data not reported in state survey report.
c/Includes treatments not specified involving herbicides, insecticides, fungicides, and other pesticides.
d/Data not sufficient as representative of all states.
e/Calculations based on data from eight states reporting.
f/Acreage too small to publish.

TABLE 3.. Summary of Acreage Planted and Treated With Pesticides by Crops, 1978. 1/

Crop	Acres Planted in 1978	Planted Acreage Treated Control of:			Percent of Planted Acreage Treated for Control of:		
		Weeds	Insects	Diseases & Other Controls	Weeds	Insects	Diseases & Other Controls
		(1000 Acres)			(Percent)		
Corn	63083.0	58575.9	2455.7	864.4	92.9	1.4	1.4
Soybeans	38804.0	36859.3	631.5	825.3	95.0	1.6	2.6
Wheat	33875.0	14913.7	991.2	5042.1	44.0	2.9	16.3
Other Small Grains	17013.0	7094.8	286.3	453.5	41.7	1.7	3.4
Alfalfa Hay	18736.0	271.5	1450.3	24.4	1.4	7.7	0.1
Other Hay	9600.0	98.3	73.8	29.2	1.0	0.9	0.3
Pasture or Rangeland	106893.4	5357.6	340.2	106.1	5.0	0.4	0.1
Dry Beans 2/	675.0	641.3	34.6	34.8	95.0	5.1	5.2
Sorghum 3/	7963.0	5926.1	2480.0	12.8	74.4	31.1	1.0
Sugarbeets 4/	536.4	507.3	158.4	69.3	94.6	29.5	15.6
Sunflowers 5/	2765.0	2313.3	177.6	98.4	83.7	6.4	3.6
Tobacco 6/	28.6	12.5	11.2	14.0	43.7	39.2	49.0
Flax 7/	865.0	441.0	11.2	28.3	51.0	1.3	3.9
Cotton 8/	210.0	208.0	115.0	81.0	99.0	54.8	38.6
Potatoes 9/	125.3	25.7	113.8	68.3	20.5	90.8	54.5
Reported Regional Total:							
Cropland Pasture and Rangeland	301172.7	133246.3	38330.8	7751.7	44.2	13.1	2.6
Cropland Only	194279.3	127888.7	38990.6	7645.6	65.8	20.1	3.9

1/ Calculated only on the basis of the number of states reporting as a major crop and/or category of pest control. See Tables 2 and 4-10 for states reporting.
2/ Michigan, North Dakota.
3/ Iowa, Kansas, Missouri, Nebraska, South Dakota.
4/ Michigan, Minnesota, North Dakota, Ohio.
5/ Minnesota, North Dakota, South Dakota.
6/ Indiana, Ohio, Wisconsin.
7/ Minnesota, North Dakota, South Dakota.
8/ Missouri.
9/ North Dakota.

TABLE 4. Acreage and Percent of Corn Land Treated With Pesticides.

State	Acres Planted 1978	Planted Acreage Treated For Control of:			Percent of Planted Acreage Treated for Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
Illinois	10990	10770.2	7253.4	405.6	98,0	66.0	3.7
Indiana	6100	5966.5	2874.6	34.9	97.8	47.1	0.6
Iowa	13500	12933.0	6804.0	13.5	95.8	50.4	0.1
Kansas	1820	1559.9	1479.8	a	85.7	81.3	a
Michigan	2670	2580.0	1260.0	48.0[b]	96.6	47.2	1.8
Minnesota	7000	6536.0	2283.0	84.0	93.4	32.6	1.2
Missouri	2400	2338.0	1178.0	29.0	97.4	49.1	1.2
Nebraska	7153	6501.0	4961.0	a	90.9	69.3	a
North Dakota	600	312.8	25.1	9.7	52.1	4.2	1.6
Ohio	3850	3785.0	1898.0	44.0	98.3	49.3	1.1
South Dakota	3250	1704.5	379.8	109.7[c]	52.4	11.7	3.4[c]
Wisconsin	3750	3589.0	2059.0	86.0	95.7	54.9	2.3
Reported Region Total	63083	58575.9	32455.7	864.4	92.9	51.4	1.4[d]

a/No data reported.
b/Reported 32000 A for disease control and 16000 A for other pest control including defoliant, growth regulation, etc. use.
c/Includes treatment not specified involving use of herbicides, insecticides, fungicides, and other pesticides.
d/Calculated on basis of those states reporting acreage treated.

TABLE 5. Acreage and Percent of Soybean Land Treated With Pesticides.

State	Acres Planted 1978	Planted Acreage Treated For Control of:			Percent of Planted Acreage Treated for Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
Illinois	9190	9006.2	88.2	422.7	98.0	1.0	4.6
Indiana	4150	3966.5	109.8	107.7	95.6	2.7	2.6
Iowa	7600	7379.6	30.4	38.0	97.1	0.4	0.5
Kansas	1480	1161.0	30.8	a	78.4	2.1	a
Michigan	810	775.0	18.0	9.0[b]	95.7	2.2	1.1
Minnesota	4100	3813.0	33.0	d	93.0	0.8	d
Missouri	5600	5318.0	195.0	129.0	95.0	3.5	2.3
Nebraska	1299	1127.0	83.0	a	86.8	6.4	a
North Dakota	175	160.8	10.9	3.5	91.9	6.2	2.0
Ohio	3780	3682.0	26.0	95.0	97.4	0.7	2.5
South Dakota	400	265.2	1.4	16.4[c]	66.3	0.4	4.1[c]
Wisconsin	220	205.0	5.0	4.0	93.2	2.3	1.8
Reported Region Total	38804	36859.3	631.5	825.3	95.0	1.6	2.6[e]

a/No data reported.
b/Reported 6500 A for disease control and 2500 A for other pest control including defoliants, growth regulators, etc.
c/Includes treatment not specified involving herbicides, insecticides, fungicides, and other pesticides.
d/Not surveyed.
e/Calculated on the basis of those states reporting acreage treated.

TABLE 6. Acreage and Percent of Wheat Land Treated With Pesticides.

State	Acres Planted 1978	Planted Acreage Treated For Control of:			Percent of Planted Acreage Treated for Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
Illinois	f						
Indiana	900	56.3	3.4	41.8	6.3	0.4	4.6[a]
Iowa	61	11.8	c	c	19.3	c	c
Kansas	11300	1085.7	516.5	3905.8[b]	9.6	4.6	34.6[b]
Michigan	470	67.0	7.0	27.5[a]	14.3	1.5	5.9[a]
Minnesota	2850	2492.0	38.0	24.0	87.4	1.3	0.8
Missouri	960	40.0	3.0	57.0	4.2	0.3	5.9
Nebraska	2751	275.0	23.0	774.0[b]	10.0	0.8	28.1[b]
North Dakota	9760	8612.2	307.4	774.1[b]	88.2	3.2	7.9[b]
Ohio	1200	59.0	19.0	24.0	4.9	1.6	2.0
South Dakota	3575	2203.5	73.5	188.0[d]	61.6	2.1	5.3[d]
Wisconsin	48	11.2	0.4	f	23.3	0.8	f
11 State Total	33875.	14913.7	991.2[g]	5042.1	44.0	2.9[g]	16.3[g]

a/Disease control - no report on other pest control.
b/Seed treatment with fungicides.
c/No data reported.
d/Includes treatment not specified involving herbicides, insecticides, fungicides, and other pesticides.
e/Data reported combined with small grains, no wheat acreage figure given.
f/Acreage too small to publish.
g/Calculations based on data only from states reporting.

TABLE 7. Acreage and Percent of Other Small Grains[a] Land Treated With Pesticides.

State	Acres Planted 1978	Planted Acreage Treated For Control of:			Percent of Planted Acreage Treated For Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
Illinois	1525[f]	67.9	14.7	64.7	4.5	1.0	4.2
Indiana	269	25.4	8.9	2.1[b]	9.4	3.3	0.8[b]
Iowa	1699	110.4	1.7	d	6.5	0.1	d
Kansas	c						
Michigan	540	269.0	48.0	15.0[b]	49.8	8.9	2.8[b]
Minnesota	3335	2036.0	48.0	11.0	61.0	1.4	0.3
Missouri	c						
Nebraska	771	65.0	24.0	d	8.4	3.1	d
North Dakota	3850	2683.3	88.7	255.2	69.7	2.3	6.6
Ohio	536	144.0	28	3.0	26.9	5.3	0.6
South Dakota	3170	1386.7	13.8	102.5[e]	43.7	0.4	3.2[e]
Wisconsin	1318	307.1	10.5	h	23.3	0.8	h
10 State Total	17013	7094.8	286.3	453.5[g]	41.7	1.7	3.4[g]

a/Includes oats, barley, and rye.
b/Data is for disease control only.
c/Crop not included in survey report.
d/No data reported,
e/Includes treatments not specified involving herbicides, insecticides, fungicides, and other pesticides.
f/Includes wheat acreage.
g/Calculated only on basis of seven states reporting.
h/Acreage too small to publish.

TABLE 8. Acreage and Percent of Alfalfa Hay Land Treated With Pesticides.

State	Acres Harvested 1978	Harvested Acreage Treated For Control of:			Percent of Harvested Acreage Treated for Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
Illinois	1220	16.3	232.8	4.9	1.3	19.1	0.4
Indiana	420	16.4	83.0	a	3.9	19.8	a
Iowa	1825	3.7	23.7	a	0.2	1.3	a
Kansas	1050	59.1	139.5	a	5.6	13.3	a
Michigan	1080	54.0	188.0	e	5.0	17.4	e
Minnesota	2140	9.0	1.0	f	0.4	<0.1	f
Missouri	550	13.0	187.0	a	2.4	34.0	a
Nebraska	1381	14.0	160.0	a	1.1	11.6	a
North Dakota	1980	4.4	4.4	0.0	0.2	0.2	0.0
Ohio	590	35.0	191.0	a	6.0	32.3	a
South Dakota	2500	18.6	59.9	19.5[b]	0.7	2.4	0.8[b]
Wisconsin	4000	28.0	180.0	e	1.0	4.0	e
12 State Total	18736	271.5	1450.3	24.4[d]	1.4	7.7	d

a/No data reported on disease and other pest control.
b/Includes treatments not specified involving herbicides, insecticides, fungicides, and other pesticides.
c/Data is for all hay.
d/Data not sufficient as representative of all states.
e/Acreage too small to be published.
f/Not surveyed.

TABLE 9. Acreage and Percent of Other Hay Land Treated With Pesticides.

State	Acres Harvested 1978	Harvested Acreage Treated For Control of:			Percent of Harvested Acreage Treated for Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
Illinois	d						
Indiana	455	4.5	2.8	a	1.0	0.6	a
Iowa	475	2.4	6.7	a	0.5	1.4	a
Kansas	b						
Michigan	290	4.5	14.5	e	1.6	5.0	e
Minnesota	920	7.0	h	h	0.8	h	h
Missouri	2900	41.0	29.0	12.0	1.4	1.0	0.4
Nebraska	b						
North Dakota	1530	19.9	0.0	0.0	1.3	0.0	0.0
Ohio	930	5.0	10.0	a	0.5	1.1	a
South Dakota	2100	14.0	10.8	17.2[c]	0.7	0.5	0.8[c]
Wisconsin	d						
8 State Total	9600	98.3	73.8	29.2[f]	1.0	0.9[g]	f

a/No data reported for disease and other pest control.
b/Crop not included in survey report.
c/Includes treatments not specified involving herbicides, insecticides, fungicides, and other pesticides.
d/Data for all hay included with alfalfa hay.
e/Too few acres to publish.
f/Data not sufficient as representative of all states.
g/Calculation based on seven states that reported.
h/Not surveyed.

TABLE 10. Acreage and Percent of State Specific[a] Major Crop Land Treated With Pesticides.

State and Region	Acres Planted 1978	Planted Acreage Treated For Control of:			Percent of Planted Acreage Treated for Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
		A - Sorghum					
Iowa	40	20.4	3.9	b	51.1	9.8	b
Kansas	4700	3249.6	1862.2	b	69.1	39.6	b
Missouri	930	791.0	103.0	1.0	85.1	11.1	0.1
Nebraska	1953	1708.4	485.4	b	87.4	24.9	b
South Dakota	340[j]	156.7	25.5	11.8[c]	46.1	7.5	3.5[c]
5 State Total	7963	5926.1	2480.0	12.8[d]	74.4	31.1	1.0[d]
		B - Sugar Beets					
Michigan	93.0	90.0	1.0	e	96.8	1.1	e
Minnesota	265.0	249.0	94.0	53.0	94.0	35.5	20.0
North Dakota	153.9	143.8	63.2	13.9	93.4	41.1	9.1
Ohio	24.5	24.5	0.2	2.4	100.0	0.8	9.8
4 State Total	536.4	507.3	158.4	69.3	94.6	29.5	15.6

TABLE 10. Acreage and Percent of State Specific[a] Major Crop Land Treated With Pesticides. (Continued)

State and Region	Acres Planted 1978	Planted Acreage Treated For Control of:			Percent of Planted Acreage Treated For Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
		C - Tobacco					
Indiana	6.6	2.3	3.2	1.0[f]	34.2	48.2	15.6[f]
Ohio	9.9	4.6	3.8	6.9[f]	46.5	38.4	69.7[f]
Wisconsin	12.1	5.6	4.2	6.1[f]	46.2	34.7	50.4[f]
3 State Total	28.6	12.5	11.2	14.0	43.7	39.2	49.0
		D - Dry Beans					
Michigan	570	550.0	34.0	18.0[g]	96.5	6.0	3.2[g]
North Dakota	105	91.3	0.6	16.8	87.0	0.6	16.0
2 State Total	675	641.3	34.6	34.8	95.0	5.1	5.2
		E - Flaxseed					
Minnesota	145	114.0	4.0	b	78.6	2.8	b
North Dakota	425	205.8	5.4	16.3	48.4	1.3	3.8
South Dakota	295	121.2	1.8	12.0	41.1	0.6	4.1[c]
3 State Total	865	441.0	11.2	28.3[h]	51.0	1.3	3.9[h]

TABLE 10. Acreage and Percent of State Specific[a] Major Crop Land Treated With Pesticides. (Continued)

State and Region	Acres Planted 1978	Planted Acreage Treated For Control of:			Percent of Planted Acreage Treated For Control of:		
		Weeds	Insects	Disease & Other Pests	Weeds	Insects	Disease & Other Pests
	(1000 Acres)	(1000 Acres)			(Percent)		
		F - Sunflowers					
Minnesota	710.0	582.0	47.0	b	84.8	6.6	b
North Dakota	1890.0	1673.0	105.1	81.2	88.5	5.6	4.3
South Dakota	165.0	58.3	25.5	17.2[c]	35.3	15.5	10.4[c]
3 State Total	2765.0	2313.3	177.6	98.4[h]	83.7	6.4	3.6[h]
		G - Cotton					
Missouri	210	208	115	81.0	99.0	54.8	38.6
		H - Potatoes					
North Dakota	125.3	25.7	113.8	68.3[i]	20.5	90.8	54.5[i]

a/Considered as a major crop in the specific states but not throughout the region.
b/No data on disease and other pest control reported.
c/Includes treatment not specified involving herbicides, insecticides, fungicides, and other pesticides.
d/Data not valid because the two states that were the largest producers plus the state that was the smallest producer did not report fungicide use. Calculations based only on the data submitted from two states.
e/Acreage too small to be reported.
f/Indiana and Ohio data mostly represents MH-30 application fo sucker control. Wisconsin data on other control.
g/Data for seed treatment or crop storage only.
h/Calculated only on basis of those states submitting data.
i/58200 acres or 46.5 percent of the acreage was also treated with other categories of pesticides mainly desiccants. and sprout inhibitors.
j/Acreage harvested for grain.

TABLE 11. Herbicide Use on Corn by State and Herbicide

Herbicide	Illinois	Indiana	Iowa	Kansas[a]	Michigan	Minnesota[b]	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 lbs. Active Ingredient)							
Alachlor	7457.7	5523.9	12110.3	574.4	2045.0	6699.4	1933.0	3564.6	197.6	3282.1	948.5	2797.0	47133.5
Ametryn		7.0								0.9			7.9
Atrazine	12924.8	7863.6	5957.0	2516.2	3349.0	3053.0	2956.0	5867.5	93.8	4451.0	14.9	4410.0	53456.8
Benfluraline		2.4											2.4
Bentazon	4.1	2.9							0.6	7.9			15.5
Butylate	14452.9	3325.9	9454.9	878.9	1091.0	3129.0	654.0	1849.9	4.7	1775.4	84.4	782.0	37483.0
Chloramben	1.0	0.6								1.2	2.7		5.5
Cyanazine	2049.5	631.4	6027.3	250.2	840.0	2260.5	534.0	1022.5	160.3	1140.7	32.6	726.0	15675.0
2,4-D	929.0	149.4	1247.4	31.2	84.0	754.6	146.0	270.5	9.5	231.3	174.4	28.0	4055.3
2,4-DB		0.1											0.1
Dextrone		3.9											3.9
Diallate									0.5				0.5
Dicamba	226.7	91.8	693.3	11.3	46.0	311.0	5.0	94.1	6.6	131.8	30.3	53.0	1700.9
Dinoseb		4.1								1.4			5.5
EPTC	329.7	607.2		1639.0			269.0	770.0	0.3	346.9	23.8	238.0	4223.9
EPTC + R-25788			259.2						95.7				354.9
Glyphosate		3.3		5.6					0.5	8.9			18.3
Linuron	5.3	52.8	40.5				12.0		0.4	4.9			115.9
MCP							5.0						5.0
MCPA		0.8							2.4				3.2
Metolachlor	646.2	700.8	180.9	20.8	108.0	119.8	80.0	101.0	5.3	215.5			2178.3
Metribuzin	1.4	13.1								2.1			16.6
Paraquat	19.9						9.0			32.9			61.8
Pendimethalin	78.3	18.0	37.8	5.6					3.2	65.6			208.5
Propachlor	703.9	220.0	1611.9	152.2		1217.7	35.0	438.0		27.9	348.9		4757.5
Simazine	312.6	304.9						87.6		237.5			942.6
2,4,5-T	0.4									1.2			1.6
Trifluralin		24.4											24.4
TOTALS	40143.4	19554.3	37620.5	6085.4	7563.0	17540.0	6638.0	14065.7	581.4	11967.1	1660.5	9034.0	172458.3

a/Totals for some chemicals include estimated calculation from tank mixes reported.
b/Data was calculated from acreage, active ingredient in the formulation, and the rate of application to determine poundage of specific pesticides on corn.

TABLE 12. — Insecticide and Fungicide Use on Corn by State and Pesticide

A. INSECTICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
	(1000 lbs. Active Ingredient)												
Aldrin										0.8			0.8
BHC		6.2											6.2
Bufencarb										b/			
Carbaryl	95.6	53.7	104.9	304.7		a/	19.0	172.4		20.1			665.5
Carbofuran	1663.4	1596.5	1379.9	390.3	516.0	642.0	476.0	1088.6	10.6	907.2	87.8	351.0	9109.3
Chlordane	73.1	35.1	12.1							42.7			163.0
Chlorpyrifos	441.2	100.7	259.2	4.8			192.0	82.9		43.0	19.4		1143.2
Diazinon	47.4	7.2	21.3	55.1		a/		21.0		15.4			167.4
Dimethoate				68.7				30.1		b/	a/		98.8
Disulfoton	a/	3.2		69.0				11.4		16.0			99.6
Endrin				0.1									0.1
EPN				37.8			a/						37.8
Ethion				23.9									23.9
Ethoprop	154.7	91.4	259.2			87.1	75.0	139.0	a/	13.2			819.6
Fensulfothion	1.1	a/	5.3										6.4
Fonofos	2694.6	682.6	1992.2	323.5	684.0	606.0	74.0	1070.9	0.7	334.5	152.0	263.0	8878.0
Heptachlor	b/	3.8	16.9	206.6			57.0			9.5			293.8
Lindane									a/,c/	0.7			0.7
Malathion	4.0	2.6		17.3				7.0		5.7			36.6
Methomyl	0.1												0.1
Methyl Parathion	a/		14.8	4.4			23.0						42.2
Oxydemeton-Methyl		0.2		83.6						0.5			84.3
Parathion				150.8				131.1		1.2	7.2		290.3
Phorate	767.0	75.9	1168.3	314.3	81.0	382.5	29.0	1017.2	a/	50.8	82.1	627.0	4595.1
Propargite				172.2									172.2
Terbufos	2838.5	433.0	1796.2	330.8	94.0	546.0	172.0	1145.3		460.8	26.3	504.0	8346.9
Toxaphene	206.1	17.5	78.5	94.7			114.0	38.8	a/	5.5	16.7		571.8
Trichlorfon	1.2	1.4								0.4			3.0
Trithion				3.6									3.6
Others							39.0 b/						39.0
TOTALS	8988.0	3111.0	7108.8	2656.2	1375.0	2263.6	1270.0	4955.7	11.3	1928.0	391.5	1745.0	35804.1

B. FUNGICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
	(1000 lbs. Active Ingredient)												
Captan		0.9							a/,c/	2.5			3.4
Carboxin		0.1											0.1
Mancozeb									0.5				0.5
Maneb									a/,c/				
Thiram		0.1											0.1
TOTALS		1.1							0.5	2.5			4.1

C. OTHER CONTROLS	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
4-AP									0.1				0.1
Methiocarb									0.1				0.1
TOTALS									0.2				0.2

a/Quantities not large enough to report data.
b/Other insecticides include aldrin, chlordane, diazinon, dioxathion, disulfoton, malathion, and parathion.
c/Seed treatment.

TABLE 13. Herbicide Use on Soybeans by State and Herbicide

Herbicide	Illinois	Indiana	Iowa	Kansas[a]	Michigan	Minnesota[b]	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
					(1000 lbs. Active Ingredient)								
Alachlor	5380.6	3635.4	4224.1	928.5	720.0	2359.6	5046.0	698.0	6.7	3791.6	157.7	239.0	27187.2
Atrazine		59.5											59.5
Bentazon	264.8	370.3	334.4	67.6	30.0	229.0	799.0	38.3	9.9	243.3		16.0	2402.6
Bifenox	36.4	8.9	95.8	37.2			67.0			16.9			262.2
Chloramben	1441.3	291.1	1051.1	106.6	159.0	1320.9	264.0	182.8	7.5	980.1	11.1	47.0	5862.5
Chlorbromuron	4.3	28.3		8.6						18.5			59.7
Chlorpropham	117.3	7.4	284.2							3.7			412.6
Chloroxuron		1.5											1.5
Cyanazine		4.0								1.7			5.7
2,4-D		3.0					45.0						48.0
2,4-DB	2.0	1.2											3.2
Dextrone		1.9											1.9
Dicamba										0.4			0.4
Dinoseb	21.1	25.6								28.8			75.5
Dinitramine	2.4	4.7	11.4	0.8					1.3				20.6
DNBP							138.0						138.0
EPTC		5.7							2.1				7.8
Fluchloralin	130.5	119.1	91.2	1.8				5.6	0.5	41.4			390.1
Glyphosate		6.8	15.2	4.2			92.0			14.6			132.8
Linuron	679.4	617.4	381.5	100.6	290.0	168.3	887.0	80.9	0.8	778.7		59.0	4043.6
Metolachlor	15.8	82.0								77.2			175.0
Metribuzin	2394.1	962.2	1798.9	192.3	100.0	198.4	834.0	138.6	0.1	776.5	1.6	27.0	7423.7
Naptalam	4.7						232.0			1.3			238.0
Naptalam & Dinoseb	204.0	432.5	44.5	22.1						157.4			860.5
Oryzalin	30.6	34.2	28.9	37.1			167.0			15.6			313.4
Paraquat	34.2						41.0			10.6			85.8
Pendimethalin	77.2	50.3	40.3	43.4				14.6	2.6	73.5			301.9
Penoxalin							45.0						45.0
Profluralin	157.7	60.0	482.6	37.9		118.8	188.0	30.9	2.2	25.6		7.0	1110.7
Propachlor				26.1									26.1
Propachlor & Atrazine		11.8											11.8
Simazine		3.8											3.8
Triallate									9.1				9.1
Trifluralin	5468.3	1526.8	3875.2	691.0	96.0	1763.0	2248.0	257.9	0.5	749.6	83.2	23.0	16782.5
Vernolate	337.6	53.2	36.5							15.7			443.0
Others							115.0[c]						115.0
TOTALS	16804.3	8408.6	12795.8	2305.8	1395.0	6158.0	11208.0	1447.6	43.3	7822.7	253.6	418.0	69060.7

a/Totals for some chemicals include estimated calculation from tank mixes reported.
b/Data was calculated from acreage, active ingredient in the formulation, and the rate of application to determine poundage of specific pesticides on soybeans.
c/Includes bensulfide, vernolate, flumeturon, MSMA, chlorobromuron, dinitramine, phenmedipham, cyanazine, and sodium chlorate.

TABLE 14. Insecticide and Fungicide Use on Soybeans by State and Pesticide

A. INSECTICIDES	Illinois	Indiana	Iowa	Kansas	Michigan[b]	Minnesota	Missouri[c]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
					(1000 lbs. Active Ingredient)								
Acephate		0.4											0.4
Azinphos-Methyl	15.6	0.8											16.4
Carbaryl	16.1	79.9	a/	6.3				19.0		18.1			139.4
Carbofuran		4.4						12.9		0.9			18.2
Carbophenothion		0.6											0.6
Chlorpyrifos	0.1												0.1
Diazinon										0.1			0.1
Dimethoate	8.2	2.8		1.2									12.2
Ethoprop	d/												
Fonofos										7.1			7.1
Lindane			0.5[e]						d/,e/				0.5
Malathion	2.7	1.1		2.5					d/	d/			6.3
Methomyl	1.1	0.6											1.7
Methoxychlor		0.9											0.9
Methyl Parathion		1.1											1.1
Parathion				3.3									3.3
Toxaphene	34.3	1.1		31.4		d/			d/		d/		66.8
TOTALS	78.1	93.7	0.5	44.7				31.9		26.2			275.1

B. FUNGICIDES	Illinois	Indiana	Iowa	Kansas	Michigan[b]	Minnesota	Missouri[c]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
					(1000 lbs. Active Ingredient)								
Benomyl		8.9	1.1							1.9			11.9
Captan		2.5	0.6[e]							3.0			6.1
Carboxin		2.9											2.9
Maneb									d/,e/				
Thiram		1.3								7.7			9.0
TOTALS		15.6	1.7							12.6			29.9

a/Quantities of individual insecticides not reported for soybeans. Calculation indicates that 22,700 pounds of carbaryl active ingredient probably were were used on 18,200 acres of soybeans, sorghum, wheat, alfalfa and corn for grasshopper control.

b/Not included in report.

c/Quantities of specific chemicals not reported. Insecticides used on small acreages include carbaryl, carbofuran, chlorpyrifos, chlordimeform, demeton, dioxathion, dicofol, dimethoate, fonofos, methyl parathion, parathion, and toxaphene.

d/Quantities not large enough to report data.

e/Seed treatment.

TABLE 15. Pesticide Use on Wheat by State and Pesticide

A. HERBICIDES	Illinois[a]	Indiana	Iowa	Kansas	Michigan	Minnesota[b]	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
						(1000 lbs. Active Ingredient)							
Atrazine[d]				67.7				14.9					82.6
Barban						169.4			104.0				273.4
Bromoxynil				7.7		55.5			9.6				72.8
Cyanazine[d]				11.5									11.5
2,4-D		12.2	0.7	716.4[c]	25.7	352.4	30.0	127.0	2991.2	21.5	647.2		4924.3
2,4-DB		0.4								0.8			1.2
Dextrone		0.4											0.4
Diallate									23.8				23.8
Dicamba		1.8	0.4	15.5		31.0		1.5	29.5	2.6	1.3		83.6
Diclofop									1.1				1.1
Difenzoquat									25.6				25.6
Glyphosate		3.9							3.1	3.5	[f]		10.5
MCPA		3.3			7.8	387.4			374.4	5.0	23.7		802.6
Paraquat[d]				0.7									0.7
Picloram									6.4		3.1		9.5
Profluralin									4.2				4.2
Propanil									22.3				22.3
Triallate						313.0			793.4				1106.4
Trifluralin									196.3		[f]		196.3
TOTALS		22.0	1.1	819.5	33.5	1308.7	30.0	143.4	4584.9	33.4	675.3		7652.8

B. INSECTICIDES	Illinois[a]	Indiana	Iowa	Kansas	Michigan	Minnesota[b]	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
						(1000 lbs. Active Ingredient)							
Azinphos Methyl		0.4								[f]			0.4
Carbaryl			[e]	3.0				1.6		0.9			5.5
Carbofuran											[f]		
Chlordane									2.4	0.2			2.6
Dimethoate				0.4							[f]		0.4
Endrin				0.4				0.4					0.8
Heptachlor				14.4									14.4
Lindane				4.7					22.2[g]	0.2[g]			27.1
Malathion		4.9		7.3				7.1	[f]	4.2			23.5
Methyl Parathion			0.2	1.6					[f]	3.4			5.2
Parathion				7.4				2.6			[f]		10.0
Phorate								6.8			38.9		45.7
Thiodan				3.4									3.4
Toxaphene				330.2				3.6	17.6	[f]	[f]		351.4

TABLE 15 (continued) Pesticide Use on Wheat by State and Pesticide

B. INSECTICIDES	Illinois[a]	Indiana	Iowa	Kansas	Michigan	Minnesota[b]	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
TOTALS		5.3	0.2[e]	372.8				22.1	42.2	8.9	38.9		490.4

C. FUNGICIDES	Illinois[a]	Indiana	Iowa	Kansas	Michigan	Minnesota[b]	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
				(1000 lbs. Active Ingredient)									
Captan		0.7		[h]					[f],[g]	1.4[g]			2.1
Carboxin		4.1							[f],[g]				4.1
Hexachlorobenzene									0.8[g]	2.0[g]			2.8
Mancozeb									1.2				1.2
Maneb		10.9							63.3[g]				74.2
Mercury									12.9[g]				12.9
Thiram		4.1							[f],[g]				4.1
TOTALS		19.8							78.2	3.4			101.4

a/Data included with small grains.
b/Data calculated from acreage, active ingredient in the formulation, and rate of application to determine poundage for specific pesticides used on wheat.
c/Includes 73,600 pounds used on wheat fallow.
d/Used on wheat fallow.
e/Calculations from data indicates that approximately 22,700 pounds of carbaryl may have been used on 18,200 acres of wheat, soybeans, corn, alfalfa and sorghum for grasshopper control.
f/Quantities too small to report data.
g/Used for seed treatment.
h/No quantities given but 4,199,600 acres were planted with treated seed. More than 18 different treatments were reported.

TABLE 16. Pesticide Use on Small Grains by State and Pesticide

A. HERBICIDES	Illinois[a]	Indiana	Iowa	Kansas[b]	Michigan	Minnesota[c]	Missouri[b]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
	(1000 lbs. Active Ingredient)												
Atrazine	6.1	3.2											9.3
Barban						86.0			46.0		d/		132.0
Bromoxynil									2.9				2.9
Butylate		1.7											1.7
Chloramben											0.7		0.7
2,4-D	64.0	10.7	29.7	75.0		350.0		33.5	704.3	49.2	338.9	83.0	1738.3
2,4-DB		1.2								9.7			10.9
Diallate									0.7				0.7
Dicamba	2.9	d/	5.4						3.9	5.6	2.7		20.5
Diclofop									0.2				0.2
Difenzoquat									16.1				16.1
Glyphosate									d/		d/		
MCPA		2.8	5.4	38.0		255.9			307.5	13.2	120.6	66.0	809.4
Paraquat										1.2			1.2
Picloram									1.4				1.4
Profluralin									1.1				1.1
Propanil									0.5				0.5
Triallate						197.0			198.3				395.3
Trifluralin	1.1	1.7							47.9		d/		50.7
TOTALS	74.1	21.3	40.5	113.0		888.9		33.5	1330.8	78.9	462.9	149.0	3192.9

B. INSECTICIDES	Illinois[a]	Indiana	Iowa	Kansas[b]	Michigan	Minnesota[c]	Missouri[b]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
Azinphos-methyl		0.5								0.9			1.4
Carbaryl	2.4		0.9	20.0				2.2	d/	3.1			28.6
Carbofuran								2.2					2.2
Chlordane									3.3				3.3
Dimethoate								0.8		d/			0.8
Hexachlorobenzene									0.5[e]				0.5
Lindane									18.0[e]	0.4[e]			18.4
Malathion	d/	0.7						1.7	d/	8.7			11.1
Methidathion										1.8			1.8
Methoxychlor									d/				
Methyl Parathion									0.7	2.3			3.0
Parathion								4.3		d/	d/		4.3
Toxaphene	20.3	9.3				d/		5.4	0.1	1.1	d/		36.2
TOTALS	22.7	10.5	0.9	20.0				16.6	22.6	18.3			111.6

C. FUNGICIDES	Illinois[a]	Indiana	Iowa	Kansas[b]	Michigan	Minnesota[c]	Missouri[b]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
	(1000 lbs. Active Ingredient)												
Captan		0.1								0.4[e]			0.5
Mancozeb									93.0				93.0
Maneb									52.5[e]				52.5
Mercury									1.3[e]				1.3
TOTALS		0.1							146.8	0.4			147.3

a/Includes wheat.
b/Data not reported.
c/Data calculated from acreage, active ingredient in formulation, and rate of application of specific pesticides used on small grains.
d/Quantity not reported for small acreage.
e/Used in seed treatment.

TABLE 17. Pesticide Use on Alfalfa by State and Pesticide

A. HERBICIDES	Illinois[c]	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota[d]	Wisconsin[c]	Total
					(1000 lbs. Active Ingredient)								
			[a]		[a]		10.0[b]						10.0
Benefin				3.4				2.0		2.9			8.3
Benfluralin		2.0											2.0
Dicamba		[d]				[d]							
Diuron				2.9									2.9
2,4-D									[d]	1.3			1.3
2,4-DB		1.6		0.6						12.5			14.7
EPTC		10.2		4.8		[d]			2.8	17.9			35.7
Glyphosate										[d]			
MCPA						[d]							
Metribuzin										1.1			1.1
Paraquat										3.0			3.0
Picloram									0.1				0.1
Profluralin								2.5		0.6			3.1
Pronamide		0.7								3.0			3.7
Propham				26.6									26.6
Simazine		2.9		46.1				11.2		2.9			63.1
Terbacil				1.0						[d]			1.0
TOTALS		17.4		85.4			10.0	15.7	2.9	45.2			176.6

B. INSECTICIDES	Illinois[c]	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[c]	Total
					(1000 lbs. Active Ingredient)								
Alfa-tox[f]		9.9	17.5	6.7						24.4			58.5
Azinphos-methyl				3.2	9.0		2.0			7.4			21.6
Carbaryl		38.2	1.1	10.5	91.0		31.0	13.1		34.6			219.5
Carbofuran		5.9	.8	28.2	33.0		47.0	15.7		13.7	[d]		144.3
Diazinon				[d]									
Dimethoate		0.6		2.6				1.5		20.6	[d]		25.3
M & M[f]		18.5		2.1						43.8			64.4
Malathion		7.9	68.8	21.8			51.0	51.8		16.4	[d]		217.7
Methidathion		12.4		4.0			8.0			19.2			43.6
Methoxychlor		0.5		0.2			2.0			10.1			12.8
Methyl Parathion		3.1		11.1			15.0			6.9			36.1
Mevinphos										0.1			0.1
Parathion		1.7		6.4			46.0	55.0		4.2	15.2		128.5
Phosmet				1.9			15.0			0.8			17.7
Trichlorfon				0.8						[d]			0.8
Toxaphene							0.7	13.7			1.2		15.6
Phorate											[d]		
BHC		0.4											0.4
Others				[d]		[d]	7.0[e]	[d]	[d]				7.0
TOTALS		99.1	88.2	99.5	130.0		224.7	150.8		202.0	16.4		1013.9

[a]/No herbicide reported.
[b]/No designation of herbicides by name because of small acreage and quantities; includes benefin, chloramben, EPTC, paraquat, proflualin, simazine and 2,4-D.
[c]/Data included with all hay.
[d]/Quantity of pesticide use not large enough for reporting data.
[e]/Includes chlorobenzilate, diazinon, dimethoate, endosulfan, EPN, and methomyl.
[f]/Some states preferred reporting the pesticide as the combination product while others reported Alfa-tox as the separate diazinon and methoxychlor constituents and M & M as malathion and methoxychlor.

TABLE 18. Pesticide Use on Other Hay by State and Pesticide

A. HERBICIDES	Illinois[a]	Indiana	Iowa	Kansas[b]	Michigan[b]	Minnesota	Missouri	Nebraska[b]	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
	(1000 lbs. Active Ingredient)												
Amitrole										c/			
Atrazine	2.0												2.0
Benefin	g/												
Chlorpropham										0.5			0.5
2,4-D	4.7	2.6	c/			c/	26.0		5.6	1.8	116.8		191.5
2,4-DB	0.3									3.7			4.0
Dicamba		2.0	c/							c/	c/		37.0
EPTC	10.2												10.2
Glyphosate	0.3									1.0			1.3
MCPA	0.3								0.2				0.5
Metribuzin	g/												
Paraquat									0.2	0.2			0.4
Picloram			c/						3.0		c/		3.0
Profluralin									c/				
Pronamide	2.2												2.2
Simazine	0.4		c/										0.4
2,4,5-T							26.0						26.0
Others							1.0[d]						1.0
TOTALS	20.4	4.6	c/				53.0		9.0	7.2	116.8		280.0

B. INSECTICIDES	Illinois[a]	Indiana	Iowa	Kansas[b]	Michigan[b]	Minnesota	Missouri	Nebraska[b]	N. Dakota	Ohio	S. Dakota	Wisconsin[a]	Total
	(1000 lbs. Active Ingredient)												
Alfa-tox[f]	54.6									0.6		21.0	76.2
Azinphos-methyl										0.4			0.4
Carbaryl	65.8	0.4								1.2			67.4
Carbofuran	13.4												13.4
Dibrom									c/				
M & M[f]	70.1	c/								1.6			71.7
Malathion	1.3	2.2	4.3							5.1	c/	30.0	42.9
Methidathion	0.5	c/								1.2		28.0	29.7
Methoxychlor										1.0			1.0
Methyl Parathion	0.1									g/			0.1
Mevinphos										g/			
Parathion									c/	0.1		c/	0.1
Phosmet	0.5												0.5
Toxaphene	c/								c/				
Others							38.0[e]						38.0
TOTALS	206.3	2.6	4.3				38.0			11.2		79.0	341.4

a/Includes all hay.
b/Data included with alfalfa.
c/Not sufficient quantity to report data.
d/Includes glyphosate, picloram, and profluralin.
e/Includes azinphos-methyl, carbaryl, carbofuran, dimethoate, dicofol, malathion, methyl parathion, and toxaphene
f/Some states preferred reporting the pesticide as the combination product while other reported Alfa-tox as the separate diazinon and methoxychlor constituents and M & M as malathion and methoxychlor.

TABLE 19. Pesticide Use on Pasture and Rangeland by State and Pesticide

A. HERBICIDES	Illinois	Indiana	Iowa	Kansas	Michigan[a]	Minnesota[b]	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
	(1000 lbs. Active Ingredient)												
Ammate				c/									
Atrazine		2.4											2.4
Bentazon			0.3							0.7			1.0
2,4-D	2.1	35.5	332.9	4139.0		55.5	568.0[d]	1.2	219.1	16.2	141.3	43.0	5553.8
2,4-DB		2.8								2.4			5.2
Dicamba	0.9	14.9	25.0	59.6				0.2	8.6	4.6	0.9		114.7
Dowpon											c/		
Glyphosate	0.5	0.7							0.3				1.5
MCPA									7.4		c/		7.4
Paraquat										1.7			1.7
Picloram	0.4		0.3	2.4				0.3	80.6	11.5	c/		95.5
Silvex	8.0			48.5									56.5
Simazine	3.9	0.4											4.3
2,4,5-T	c/		0.5	1256.4			207.0[e]		c/	15.2			1479.1
Others			c/				123.0[f]						123.0
TOTALS	15.8	56.7	359.0	5505.9		55.5	898.0	1.7	316.0	52.3	142.2	43.0	7446.1

B. INSECTICIDES	Illinois	Indiana	Iowa	Kansas	Michigan[a]	Minnesota[b]	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
	(1000 lbs. Active Ingredient)												
Carbaryl	35.4							16.0					51.4
Dimethoate	0.7												0.7
M & M										7.5			7.5
Malathion	0.2							129.9			c/		130.1
Methidathion	0.4												0.4
Methyl Parathion	c/												
Parathion								7.6			11.0		18.6
Phosmet	c/												
Toxaphene	22.0		2.4					14.2	c/		c/		38.6
Others							288.0[g]						288.0
TOTALS	58.7		2.4				288.0	167.7		7.5	11.0		535.3

a/No data reported.
b/Data calculated from acreage, active ingredient in the formulation, and the rate of application.
c/Quantities not sufficient to report data.
d/Includes 432.0 for pasture and 136.0 for fence rows, ditches, idle, and other lands.
e/Includes 111.0 for pasture and 96.0 for fence rows, ditches, idle, and other lands.
f/Includes 38.0 for pasture and 85.0 for fence rows, ditches, idle, and other lands. Other herbicides include alachlor, atrazine, cyanazine, dicamba, glyphosate, MCPA, picloram, and trifluralin.
g/Includes 61.0 for pasture and 227.0 for fence rows, ditches, idle, and other lands. Other insecticides include carbaryl, carbofuran, dimethoate, malathion, parathion, methomyl, and toxaphene.

TABLE 20. Pesticide Use on Tobacco by State and Pesticide

A. HERBICIDES	Indiana	Ohio	Wisconsin	Total
	(1000 lbs. Active Ingredient)			
Benefin		4.3	4.6	8.9
Benfluralin	3.7			3.7
Diphenamid			7.5	7.5
Pebulate		5.5	2.1	7.6
Others	a/	b/		
TOTALS	3.7	9.8	14.2	27.7

B. INSECTICIDES	Indiana	Ohio	Wisconsin	Total
	(1000 lbs. Active Ingredient)			
Carbaryl	4.8	2.9		7.7
Carbofuran	3.3			3.3
Diazinon		0.8	3.4	4.2
Dimethoate			0.7	0.7
Disulfoton		2.9		2.9
Methidathion	1.4			1.4
Others	c/	d/		
TOTALS	9.5	6.6	4.1	20.2

C. OTHER CHEMICALS	Indiana	Ohio	Wisconsin	Total
	(1000 lbs. Active Ingredient)			
Maleic hydrazide	3.4	24.6		28.0
Growth Regulators e/			12.6 qt.	12.6
TOTALS	3.4	24.6	12.6	40.6

a/Other herbicides in quantities too small for reporting data include meta-sodium, pebulate, and simazine.
b/Other herbicides in quantities too small for reporting data include 2,4-D, diphenamid, EPTC, and simazine.
c/Other insecticides in quantities too small for reporting data include DDT, endosulfan, malathion, methomyl, methyl bromide, and methyl parathion.
d/Other insecticides in quantities too small for reporting data include acephate, carbofuran, malathion, and trichlorfon.
e/Identity not indicated.

TABLE 21. Pesticide Use on Sugarbeets by State and Pesticide

A. HERBICIDES	Michigan	Minnesota	N. Dakota	Ohio	Total
	(1000 lbs. Active Ingredient)				
Barban		86.0	15.3		101.3
Cycloate	100.0		6.7	4.2	110.9
2,4-D			a/		
Dalapon			29.0		29.0
Desmedipham	7.0		15.2	0.7	22.9
Diallate		a/	69.6		69.6
Diethatyl			0.1		0.1
Endothall	3.0		1.4	1.8	6.2
EPTC		724.0	348.1	3.8	1075.9
Ethofumesate	3.0				3.0
Phenmedipham	2.0		4.7	0.9	7.6
Pyrazon	110.0		43.3	29.5	183.8
Triallate			8.5		8.5
Trichloracetic Acid	82.0		69.8	58.3	210.1
Trifluralin			0.4	1.9	2.3
TOTALS	308.0	810.0	612.1	101.1	1831.2

B. INSECTICIDES	Michigan	Minnesota	N. Dakota	Ohio	Total
	(1000 lbs. Active Ingredient)				
Aldicarb		37.0	46.8		83.8
Diazinon			4.6		4.6
Fonofos		34.3	23.6		57.9
Terbufos		35.8	25.6		61.4
Others		a/	b/	c/	
TOTALS		107.1	100.6		207.7

C. FUNGICIDES	Michigan	Minnesota	N. Dakota	Ohio	Total
	(1000 lbs. Active Ingredient)				
Benomyl			0.1	0.7	0.8
Mancozeb			1.4		1.4
Thiabendazole			1.7		1.7
Triphenyltin hydroxide			1.4		1.4
Others			d/		
TOTALS			4.6	0.7	5.3

a/Quantity too small for reporting data.
b/Other insecticides in quantities too small for reporting data include carbaryl, phorate, toxaphene, and trichlorfon.
c/Carbaryl used in quantities too small for reporting data.
d/Other fungicides in quantities too small for reporting data include copper hydroxide and captan + lindane seed treatment (Isotox®).

TABLE 22. Pesticides Used on Sorghum by State and Pesticide

A. HERBICIDES	Iowa	Kansas	Missouri	Nebraska	S. Dakota	Total
			(1000 lbs. Active Ingredient)			
Alachlor	10.5		12.0		b/	22.5
Atrazine	9.2	1193.1	962.0	1368.4	b/	3532.7
Cyanazine		110.1	12.0	31.3		153.4
2,4-D	0.8	281.5	66.0	140.5	36.3	525.1
Dicamba		8.7			b/	8.7
Glyphosate		9.5			b/	9.5
Linuron	2.7					2.7
Propazine		857.6		9.1		866.7
Propachlor	7.8	3613.2	707.0	1546.8	49.3	5924.1
Terbutryn		659.8	22.0			681.8
Others			7.0 a/		b/	7.0
TOTALS	31.0	6733.5	1788.0	3096.1	85.6	11734.2

B. INSECTICIDES	Iowa	Kansas	Missouri	Nebraska	S. Dakota	Total
			(1000 lbs. Active Ingredient)			
Carbaryl	c/	257.5	41.0	13.1		311.6
Carbofuran		106.9	5.0	52.0	b/	163.9
Demeton		1.0				1.0
Dimethoate		7.2		10.4	2.7	20.3
Disulfoton		364.2		116.2		480.4
Fonofos				5.0		5.0
Heptachlor		30.7	36.0			66.7
Lindane		2.7				2.7
Malathion		42.1		3.3	b/	45.4
Methyl Parathion		1.1				1.1
Oxydemeton-Methyl		2.4				2.4
Parathion		245.7		82.8	b/	328.5
Phorate		188.8		89.9	b/	278.7
Sulfoton			11.0			11.0
Terbufos	3.0					3.0
Toxaphene		375.5	20.0		b/	395.5
Others			25.0 d/			25.0
TOTALS	3.0	1625.8	138.0	372.7	2.7	2142.2

a/Other herbicides not designated for specific quantities include chloramben, linuron, paraquat, metribuzin, and trifluralin.

b/Herbicide quantities too small to report data also include MCPA and phorate. Other insecticides include toxaphene.

c/Analysis of data indicates that approximately 22,700 pounds of carbaryl were probably used on 18,200 acres of sorghum, soybeans, wheat, corn, and alfalfa for grasshopper control.

d/Other insecticides in too small of quantities to report separately include diazinon, dimethoate, methomyl, chlorpyrifos, malathion, and parathion.

TABLE 23. Pesticide Use on Dry Beans by State and Pesticide

A. HERBICIDES	Michigan	N. Dakota	Total
	(1000 lbs. Active Ingredient)		
Alachlor	26.0	2.0	28.0
Bentazon		0.4	0.4
Chloramben	46.0	2.2	48.2
Diallate		0.1	0.1
Dinitramine	92.0	0.8	92.8
Dinoseb	49.0		49.0
EPTC	306.0	54.6	360.6
Profluralin	15.0	3.7	18.7
Triallate		2.1	2.1
Trifluralin	683.0	53.4	736.4
TOTALS[a/]	1217.0	119.3	1336.3

B. INSECTICIDES a/	Michigan	N. Dakota	Total
	(1000 lbs. Active Ingredient)		
Disulfoton	14.0		14.0

C. FUNGICIDES	Michigan	N. Dakota	Total
	(1000 lbs. Active Ingredient)		
Benomyl		1.4	1.4
Mancozeb		8.4	8.4
Maneb		21.9	21.9
TOTALS[a/]		31.7	31.7

a/Other pesticides used on dry beans in quantities too small to report data include: Herbicides - linuron and 2,4-D; Insecticides - toxaphene; and Fungicides including seed treatment - copper hydroxide, Isotox® (captan + lindane), maneb, and zineb.

TABLE 24. Pesticide Use on Flax by State and Pesticide

A. HERBICIDES	Minnesota[a/]	N. Dakota	S. Dakota	Total
	(1000 lbs. Active Ingredient)			
Asulum	33.4			33.4
Barban		2.0		2.0
Bromoxynil		0.1		0.1
2,4-D		3.0	b/	3.0
Dalapon	97.7	89.4	4.0	191.1
Diallate		1.1		1.1
Dicamba		1.6		1.6
EPTC		85.2		85.2
MCPA	20.0	35.7	17.7	63.4
Triallate		7.6		7.6
Trifluralin		5.1	b/	5.1
TOTALS	151.1	230.8	21.7	403.6

B. INSECTICIDES	Minnesota[a/]	N. Dakota	S. Dakota	Total
	(1000 lbs. Active Ingredient)			
Parathion			b/	
Toxaphene		b/		

a/Data calcualted from acreage, active ingredient in the formulation, and the rate of application to determine poundage of specific pesticides applied to indicated crops.
b/Quantities not sufficient to report data.

TABLE 25. **Pesticide Use on Sunflower by State and Pesticide**

A. HERBICIDES	Minnesota[a]	N. Dakota	S. Dakota	Total
		(1000 lbs. Active Ingredient)		
Alachlor		4.0		4.0
Barban		1.1		1.1
Chloramben	49.3	21.6	b/	70.9
Cyanazine		b/		
Diallate		1.7		1.7
Dicamba			b/	
Dinitramine		9.6		9.6
EPTC	132.3	767.2		899.5
Fluchloralin		b/		
Glyphosate		3.8	b/	3.8
Pendimethalin		0.6		0.6
Profluralin		98.1		98.1
Propachlor			b/	
Trifluralin	492.2	1088.7		1580.9
Triallate		44.3		44.3
Others		6.6[c]		6.6
TOTALS	673.8	2047.3		2721.1

B. INSECTICIDES	Minnesota[a]	N. Dakota	S. Dakota	Total
		(1000 lbs. Active Ingredient)		
Endosulfan	b/			
Malathion			0.4	0.4
Methidathion	b/	b/		
Methyl Parathion		b/		
Toxaphene	b/	72.2		72.2
TOTALS		72.2	0.4	72.4

C. SEED TREATMENT	Minnesota[a]	N. Dakota	S. Dakota	Total
		(1000 lbs. Active Ingredient)		
Captan & Lindane (2:1)		0.7		0.7
Maneb & Lindane (2.1:1)		0.3		0.3
TOTALS		1.0		1.0

D. OTHER CHEMICALS	Minnesota[a]	N. Dakota	S. Dakota	Total
		(1000 lbs. Active Ingredient)		
4-AP		b/		
Paraquat		41.8		41.8
Sodium Chlorate		5.1		5.1
TOTALS		46.9		46.9

a/Data calculated from acreage, active ingredient in the formulation, and rate of application to determine poundage of specific pesticides applied to indicated crops.
b/Quantities not sufficient to report data.
c/Identity of other pesticide not given.

TABLE 26. Corn Acreage Treated with Herbicides by State and Herbicide[a/]

HERBICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Alachlor	3950.6	2892.1	5913.0	300.8	1130.0	3282.0	1198.0	1897.4	139.1	1718.4	729.6	1504.0	24655.0
Ametryn		4.0								0.8			4.8
Atrazine	8948.7	5108.9	6331.5	1393.0	2080.0	1404.5	2049.0	4263.9	61.9	2747.5	74.6	3000.0	37463.5
Benfluralin		1.2											1.2
Bentazon	10.5	2.0		0.4					1.1	6.8			20.8
Butylate	4419.8	1017.1	3820.5	290.3	353.0	540.0	197.0	564.3	2.7	497.3	24.1	229.0	11955.1
Chloramben	1.0	1.0								0.8	4.4		7.2
Cyanazine	1306.6	426.6	3955.5	143.3	535.0	820.0	426.0	679.0	126.6	679.0	23.3	443.0	9563.9
2,4-D	2275.5	383.2	3186.0	69.4	150.0	1175.0	148.0	608.7	32.0	550.7	388.3	53.0	9019.8
2,4-DB		1.3								<0.5			1.8
Dextrone		6.3											6.3
Diallate									1.3				1.3
Dicamba	670.2	183.5	2659.5	29.8	144.0	1172.0	23.0	271.8	26.6	549.2	151.4	83.0	5964.0
Dinoseb		1.8								8.3			10.1
EPTC	109.2	159.8					76.0		0.3	66.2		60.0	471.5
EPTC + R-25788			54.0	349.0		92.0		216.9	27.7		6.6		746.2
Glyphosate		0.8		1.6					0.3	5.7			8.4
Linuron	5.1	40.9	40.5				19.0		0.2	7.6			113.3
MCP							22.0						22.0
MCPA		0.5							5.9				6.4
Metolachlor	309.7	372.7	81.0	12.8	67.0	68.0	44.0	67.3	4.8	125.3			1152.6
Metribuzin	2.8	14.5								3.8			21.1
Paraquat	46.3						17.0			62.1			125.4
Pendimethalin	45.1	14.1	27.0	4.6					5.0	46.2			142.0
Picloram									0.7				0.7
Propachlor	417.5	70.3	526.5	48.7		615.0	18.0	275.4	0.5	15.5	232.6		2220.0
Simazine	297.1	240.1						38.1		181.3			756.6
2,4,5-T	3.6									9.1			12.7
Trifluralin		6.1							0.4				6.5
Others		b/					18.0[c/]	62.6			d/		80.6
TOTALS	22819.3	10948.8	26595.0	2643.7	4459.0	9168.5	4255.0	8945.4	437.1	7282.1	1634.9	5372.0	104560.8

a/Includes all acres receiving application of specific herbicide whether single formulation or tank mix combination.
b/Includes dinitramine, fluchloralin in less than 500 treated acres.
c/Includes bensulide, metribuzin, penoxalin, and 2,4,5-T, but acreage not indicated.
d/Includes dalapon, MCPA, metribuzin, picloram, trifluralin treatments on less than 500 acres each. Also 171.8 acres treated with chemicals not identified.

TABLE 27. Corn Acreage Treated with Insecticides and Fungicides by State and Pesticide[a/]

A. INSECTICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Aldrin										0.6			0.6
BHC		8.2											8.2
Bufencarb										0.5			0.5
Carbaryl	97.3	50.2	80.6	130.1		c/	24.0	223.9		9.7			615.8
Carbofuran	1708.8	1550.0	1569.7	387.1	496.0	738.0	453.0	1327.5	12.4	945.0	109.7	413.0	9710.2
Chlordane	31.5	18.2	12.1							21.8			83.6
Chlorpyrifos	391.3	81.2	260.0	4.8			130.0	57.5		42.2	17.6	-	984.6
Diazinon	94.4	17.6	39.0	47.5		c/		17.5		34.9			250.9
Dimethoate				101.8				65.5		0.5	b/		167.8
Disulfoton	13.2	3.9		69.0				12.7		16.0			114.8
Endrin				3.6									3.6
EPN				69.0			30.0						99.0
Ethion				23.9									23.9
Ethoprop	163.0	87.9	321.9			105.0	93.0	152.7	1.4	14.7			939.6
Fensulfothion	1.1	b/	6.4										7.5
Fonofos	2200.3	620.5	1862.4	323.5	575.0	538.0	140.0	1245.2	1.2	331.2	138.2	289.0	8264.5
Heptachlor	2.7	3.8	30.4	103.3			35.0			17.5			192.7
Lindane									13.2	64.8			78.0
Malathion	10.5	1.8		11.1				10.0		4.0			3[illegible] 4
Methomyl	0.2												[illegible].2
Methyl Parathion	1.1		19.7	8.8			31.0						60.6
Oxydemeton-Methyl		1.0		146.6						2.6			150.2
Parathion				168.8				187.3		1.1	14.4		371.6
Phorate	701.1	60.2	1141.7	294.8	67.0	340.0	36.0	875.2	1.8	48.8	74.6	615.0	4256.2
Propargite				110.9									110.9
Terbufos	2512.0	376.5	1761.0	330.8	82.0	449.0	176.0	954.4		407.8	26.3	450.0	7525.8
Toxaphene	48.7	16.7	21.4	32.5			48.0	27.7	3.1	5.7	8.8		212.6
Trichlorfon	1.5	1.3					16.0			0.6			19.4
Trithion				3.6									3.6
Others			62.4	294.4		114.0[d/]	35.0	128.8			e/		634.6
TOTALS	7978.7	2899.0	7188.7	2665.9	1220.0	2284.0	1247.0	5285.9	33.1	1970.0	389.6	1767.0	34928.9

TABLE 27. (continued) Corn Acreage Treated with Insecticides and Fungicides by State and Pesticide[a/]

B. FUNGICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Captan		21.8							10.3	91.0			123.1
Carboxin		0.9											0.9
Mancozeb									0.4				0.4
Maneb									2.9				2.9
Thiram		0.9											0.9
TOTALS		23.6							13.6	91.0			128.2

C. OTHER CONTROLS	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
4-AP										14.5			14.5
Methiocarb										0.5			0.5
TOTALS										15.0			15.0

a/Includes all acres receiving application of specific pesticide whether single or mixed formulation.
b/Acreage not reported if less than 500 acres.
c/Included with others.
d/Includes parathion, chlordane, diazinon, dioxathion, disulfoton, malathion, aldrin.
e/Includes 717.8 acres treated but pesticides not specified.

TABLE 28. Soybean Acreage Treated with Herbicides by State and Herbicide[a/]

	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Alachlor	3039.9	1933.7	2477.6	404.9	416.0	1174.0	2852.0	537.1	7.4	1995.6	131.8	129.0	15098.6
Atrazine		42.3											42.3
Barban									0.2				0.2
Bentazon	348.4	363.0	334.4	67.6	35.0	229.0	824.0	38.3	15.2	217.2		11.0	2519.1
Bifenox	28.4	5.8	76.0	22.6			71.0			14.1			217.9
Chloramben	1402.0	259.9	1026.0	53.3	725.0	1038.0	193.0	97.6	12.3	810.0	7.4	38.0	5662.5
Chlorbromuron	6.2	25.7		6.8						14.7			53.4
Chlorpropham	45.8	3.7	266.0							3.7			319.2
Chloroxuron		1.2											1.2
Cyanazine		6.1								1.4			7.5
2,4-D		4.0					74.0						78.0
2,4-DB	18.4	7.7								<0.5			26.6
Dextrone		4.6											4.6
Dicamba		<0.5								0.6			1.1
Dinoseb	5.1	14.3								11.4			30.8
Dinitramine	5.4	4.2	22.8	1.6					2.7				36.7
DNBP							197.0						197.0
EPTC		1.5							1.2				2.7
Fluchloralin	169.5	96.8	76.0	1.8				6.2	0.6	35.4			386.3
Glyphosate	0.4	6.4	15.2	1.2			37.0			11.0			71.2
Linuron	1282.0	935.4	433.2	92.9	377.0	198.0	1431.0	117.4	1.0	1128.5		79.0	6075.4
Metolachlor	7.0	37.6							0.1	38.6			83.3
Metribuzin	5029.7	1688.1	3078.0	449.6	208.0	508.0	1909.0	385.9	12.4	1465.1	5.4	46.0	14785.2
Naptalam	4.7						174.0			1.6			180.3
Naptalam & Dinoseb	64.6	133.5	15.2	9.8						62.2			285.3
Oryzalin	34.3	33.5	15.2	50.8			153.0			17.5			304.3
Paraquat	76.0						41.0						117.0
Pendimethalin	72.1	34.2	38.0	38.5				14.4	2.2	57.4			256.8
Penoxalin							39.0						39.0
Profluralin	160.9	58.3	478.8	43.7		132.0	143.0	53.7	10.1	26.7		6.0	1113.2
Propachlor		4.3											4.3
Simazine		2.9											2.9
Triallate									0.5				0.5
Trifluralin	5817.3	1454.1	4385.2	551.2	122.0	1763.0	2003.0	331.6	122.7	713.9	83.2	27.0	17374.2
Vernolate	143.7	17.8	53.2							6.1			220.8
Others							80.0[b/]	12.7			51.4[c/]		144.1
TOTALS -	17761.8	7181.1	12790.8	1796.3	1883.0	5042.0	10221.0	1594.9	188.6	6633.2	278.8	336.0	65707.5

a/Data reported are for each individual pesticide applied either separately or in combination on the same acreage.
b/Includes bensulide, vernolate, fluometuron, MSMA, chlorobromuron, dinitramine, phenmedipham, cyanazine, and sodium chlorate used on less than 0.5% of the acreage for any specific herbicide.
c/Includes all other acreage treated with any pesticide not specified.

TABLE 29. Soybean Acreage Treated with Insecticides and Fungicides by State and Pesticide[a/]

A. INSECTICIDES	Illinois	Indiana	Iowa	Kansas	Michigan[b/]	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Acephate		0.9											0.9
Azinphos Methyl	20.8	1.1											21.9
Carbaryl	25.5	85.9	c/	2.8				22.4		15.6			152.2
Carbofuran		5.2						25.7		0.9			31.8
Carbophenothion		1.2											1.2
Chlorpyrifos	0.2	< 0.5											0.7
Diazinon		< 0.5								4.4			4.9
Dimethoate	11.6	3.2		1.2									16.0
Ethoprop	5.4												5.4
Fonofos										4.7			4.7
Lindane									3.5				3.5
Malathion	2.2	1.4		2.2					0.8	< 0.5			7.1
Methomyl	2.4	2.0											4.4
Methoxychlor		0.9											0.9
Methyl Parathion		1.7											1.7
Parathion				6.6									6.6
Toxaphene	20.2	1.4		15.3		d/			6.5				43.4
Others				2.5		33.0	213.0[e/]	34.0	0.8				283.3
TOTALS	88.3	105.9		30.6		33.0	213.0	82.1	11.6	26.1			590.6

B. FUNGICIDES f/	Illinois	Indiana	Iowa	Kansas	Michigan[b/]	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Benomyl		12.6								3.7			16.3
Captan		49.9								60.2			110.1
Carboxin		24.1											24.1
Maneb									3.5				3.5
Thiram		20.0								8.6			28.6
TOTALS		106.6							3.5	72.5			182.6

a/Data reported for each individual pesticide applied either separately or in combination on the same acreage.
b/Data not reported.
c/Carbaryl used on 18,200 acres of soybeans, sorghum, and wheat but no acreage designation or each.
d/Included with others.
e/Includes carbofuran, chlorpyrifos, chlordimeform, malathion, dioxathion, toxaphene, dicofol, dimethoate, fonofos, parathion, methyl parathion, carbaryl, and demeton used on less than 0.5% of planted acreage for any specific insecticide.
f/Involves mostly seed treatment.

TABLE 30. Wheat Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Illinois[b/]	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Atrazine		<0.5		67.7[d/]				14.3[d/]					82.5
Barban						308.0			431.4				739.4
Bromoxynil				23.2		111.0			32.9				167.1
Cyanazine				4.8[d/]									4.8
2,4-D		24.3	2.7	1125.6[d/]	45.0	1164.0	40.0	201.8	7371.4	39.8	1613.3		11627.9
2,4-DB		0.7								1.5			2.2
Dextrone		0.7											0.7
Diallate									11.9				11.9
Dicamba		12.6	2.7	124.0		310.0		12.1	201.9	9.8	13.3		686.4
Diclofop									1.5				1.5
Difenzoquat									41.1				41.1
Glyphosate		1.3							3.8	3.4			8.5
MCPA		13.1			16.5	1024.0			966.9	9.1	68.4		2098.0
Paraquat				2.8[d/]									2.8
Picloram									233.5		30.9		264.4
Profluralin									4.2				4.2
Propanil									17.4				17.4
Triallate						313.0			771.1				1084.1
Trifluralin									387.1				387.1
Others			9.1					51.4	34.8				95.3
TOTALS		53.2	14.5	1348.1	61.5	3230.0	40.0	279.6	10510.9	63.6	1725.9		17327.3

B. INSECTICIDES	Illinois[b/]	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Azinphos-methyl		0.7								<0.5			<1.2
Carbaryl			[c/]	2.0				1.6		1.8			5.4
Chlordane									2.0	0.7			2.7
Dimethoate				1.0									1.0
Endrin				1.0				1.2					2.2
Heptachlor				467.0[e/]									467.0
Lindane				145.2[e/]					573.9[f/]	1.8			720.9
Malathion		2.7		7.3				7.1	2.5	7.2			26.8
Methyl Parathion			0.4	3.2					7.8	9.3			20.7

TABLE 30. (continued) Wheat Acreage Treated with Pesticides by State and Pesticide[a/]

B. INSECTICIDES	Illinois[b/]	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Parathion				14.7				3.2					17.9
Phorate								7.1			48.6		55.6
Thiodan				6.7									6.7
Toxaphene				74.9				1.6	11.7	<0.5			88.7
Others				86.4		38.0		1.2					125.6
TOTALS		3.4	0.4	809.4		38.0		23.0	597.9	21.8	48.6		1542.5

C. FUNGICIDES	Illinois[b/]	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Captan		8.5		518.1[e/]					2.0	17.6			546.2
Carboxin		28.6		1189.0					36.9				1254.5
Hexachlorobenzene				848.8					35.1	5.5			889.4
Mancozeb									0.5				0.5
Maneb		7.7		677.5					609.0				1294.2
Mercury									98.0				98.0
Terrazole				140.1									140.1
Thiram		25.1		75.1					36.9				137.1
Others				744.9					16.2		649.0[g/]		1410.1
TOTALS		69.9		4193.5					834.6	23.1	649.0		5770.1

a/Data reported for individual pesticides applied either separately or in combination on the same acreage.
b/Included with data for small grains.
c/18,200 acres of wheat, soybean, sorghum, alfalfa and corn land treated with carbaryl for grasshopper control but no breakdown in specific acreage.
d/Used on wheat fallow or stubble plus 112,000 pounds a.i. of 2,4-D used on wheat fallow.
e/Involves wheat seed treatment and thus acres planted with treated seed. Lindane treated seed on 66,600 acres and heptachlor treated seed on 227,200 acres.
f/Seed treatment with captan and maneb.
g/Includes all other acreage treated but no pesticide identification indicated.

TABLE 31. Small Grains Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Illinois[b/]	Indiana	Iowa	Kansas[c/]	Michigan	Minnesota	Missouri[c/]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Atrazine	3.9	2.0											5.9
Barban						172.0			171.0				343.0
Bromoxynil									14.7				14.7
Butylate		0.5											0.5
Chloramben											2.3		2.3
2,4-D	52.5	11.6	61.7		160.0	875.0		58.6	1740.5	86.4	847.2	139.0	4032.5
2,4-DB		1.3								10.7			12.0
Diallate									0.7				0.7
Dicamba	9.5	<0.5	24.0						25.2	20.9	13.7		93.8
Diclofop									0.2				0.2
Difenzoquat									25.8				25.8
Glyphosate									1.0	<0.5			1.5
MCPA	1.4	7.4	15.3		96.0	853.0			802.3	31.4	302.9	132.0	2241.7
Paraquat										2.4			2.4
Picloram									48.8				48.8
Profluralin									1.2				1.2
Propanil									0.6				0.6
Triallate						197.0			195.2				392.2
Trifluralin	0.7	2.3							83.5				86.5
Others			30.8					5.6	15.7[d/]				54.1
TOTALS	68.0	25.6	131.8		256.0	2097.0		64.2	3126.4	152.3	1166.1	271.0	7358.4

B. INSECTICIDES	Illinois[b/]	Indiana	Iowa	Kansas[c/]	Michigan	Minnesota	Missouri[c/]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Azinphos-methyl		0.9								2.2			3.1
Carbaryl	3.2		0.5		22.0			2.2	0.2	4.1			32.2
Carbofuran								5.5					5.5
Chlordane									2.9				2.9
Dimethoate								1.2		<0.5			1.7
Hexachlorobenzene									8.2[e/]				8.2
Lindane									245.9[e/]	5.2			251.1
Malathion	1.3	1.1						1.2	2.6	9.2			15.4
Methidathion										0.9			0.9

TABLE 31. (continued) Small Grains Acreage Treated with Pesticides by State and Pesticide[a/]

B. INSECTICIDES	Illinois[b/]	Indiana	Iowa	Kansas[c/]	Michigan	Minnesota	Missouri[c/]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Methoxychlor										<0.5			<0.5
Methyl Parathion									2.5	6.2			8.7
Parathion								8.6		0.5			9.1
Toxaphene	10.1	6.2				39.0		2.4	7.5	1.5			66.7
Others						9.0		2.9					11.9
TOTALS	14.6	8.2	0.5		22.0	48.0		24.0	269.8	30.8			417.9

C. FUNGICIDES	Illinois[b/]	Indiana	Iowa	Kansas[c/]	Michigan	Minnesota	Missouri[c/]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Captan		0.8								8.2			9.0
Carboxin									18.9				18.9
Maneb									254.1				254.1
Mercury									19.5				19.5
Thiram									18.9				18.9
Others									3.1[f/]		322.4[g/]		325.5
TOTALS		0.8							314.5	8.2	322.4		645.9

a/Data reported for each individual pesticide applied either separately or in combination on the same acreage.
b/Includes wheat.
c/Data not reported.
d/Includes unspecified small acreage using metribuzin, chloramben, propanil, sodium chlorate, barban, EPTC, triallate, glyphosate, cyanazine, and unknown.
e/Used as seed treatment in combination with maneb.
f/Includes TCMTB.
g/Includes all other acreage treated but no specific pesticide indentification indicated.

TABLE 32. Alfalfa Acreage Treated with Pesticides by State and Pesticide [a/]

A. HERBICIDES	Illinois[b/]	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Benefin			[c/]	3.0				1.8		4.0			8.8
Benfluralin		1.3											1.3
Dicamba		<0.5											<0.5
Diuron				1.8									1.8
2,4-D				0.6					0.5	0.9	7.0		9.0
2,4-DB		0.9								15.1			16.0
EPTC		1.7		1.9		3.0			2.8	3.8			13.2
Glyphosate										<0.5			<0.5
MCPA						3.0			0.1				3.1
Metribuzin										1.5			1.5
Paraquat										4.0			4.0
Picloram									<0.1				<0.1
Profluralin				4.7				2.8		0.5			8.0
Pronamide		0.7								3.6			4.3
Propham				7.6									7.6
Simazine		3.6		38.4				10.8		3.0			55.8
Terbacil				1.2						<0.5			1.7
Others							13.0[d/]	3.7					16.7
TOTALS		8.7		59.2		6.0	13.0	19.1	3.5	37.4	7.0		153.9

B. INSECTICIDES	Illinois[b/]	Indiana	Iowa	Kansas	Michgian	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Alfa-tox[g/]			29.0							28.0			57.0
Azinphos-methyl				4.2	23.0		3.0			10.7			40.9
BHC		0.5											0.5
Carbaryl		26.5	0.5	8.5	78.0		21.0	21.8	0.3	30.1			186.7
Carbofuran		8.8	2.0	57.8	64.0		50.0	23.1		17.1			222.8
Diazinon		7.4		3.7									11.1
Dimethoate		1.1		4.9				3.6		23.1			32.7
M & M[g/]		8.2								19.4			27.6
Malathion		7.7	4.8	14.9			21.0	43.1	0.4	15.5			107.4
Methidathion		15.1		7.9			16.0			31.0			70.0
Methoxychlor		8.1		3.3			4.0			16.6			32.0

TABLE 32. (continued) Alfalfa Acreage Treated with Pesticides by State and Pesticide[a/]

B. INSECTICIDES	Illinois[b/]	Indiana	Iowa	Kansas	Michgian	Minnesota	Missouri	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Methyl Parathion		5.0		23.0			36.0			11.0			75.0
Mevinphos										0.5			0.5
Parathion		1.7		11.5			32.0	61.1	1.0	7.3	30.3		144.9
Phosmet				1.9			17.0			0.8			19.7
Trichlorfon				0.8						<0.5			1.3
Toxaphene							4.0[e/]	6.5	1.2		8.7[f/]		20.4
Others				7.9		1.0	14.0[e/]		1.5		26.7[f/]		51.1
TOTALS		90.1	36.3	150.3	165.0	1.0	218.0	159.2	4.4	211.6	65.7		1101.6

a/Data reported for each individual pesticide applied either separately or in combination on the same acreage.
b/Data included with other hay.
c/Data not reported.
d/Less than 0.5% of acreage treated with any specific herbicide including benefin, chloramben, EPTC, paraquat, profluralin, simazine, and 2,4-D.
e/Less than 0.5% of acreage treated with any specific insecticide including chlorobenzilate, diazinon, dimethoate, endosulfan, EPN, and methomyl.
f/Includes all other acreage treated but type of treatment nor specific pesticide not identified.
g/Some states preferred reporting the pesticide as the combination product while others reported Alfa-tox as the separate diazinon and methoxychlor constituents and M & M as malathion and methoxychlor.

TABLE 33. Other Hay Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Illinois[b/]	Indiana	Iowa	Kansas[c/]	Michigan[c/]	Minnesota	Missouri	Nebraska[c/]	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Amitrole										<0.5			<0.5
Atrazine	2.1												2.1
Benefin	1.5												1.5
Chlorpropham										0.5			0.5
2,4-D	4.7	2.6	0.1			7.0	24.0		8.3	1.2	7.3		55.2
2,4-DB	0.7									2.7			3.4
Dicamba		1.0	0.1							<0.5			1.6
EPTC	2.9												2.9
Glyphosate	0.3									0.8			1.1
MCPA	0.1								0.8				0.9
Metribuzin	0.2												0.2
Paraquat									0.2	0.7			0.9
Picloram		<0.5							9.8				10.3
Profluralin									0.1				0.1
Pronamide	3.5												3.5
Simazine	0.4	<0.5											0.9
2,4,5-T							17.0						17.0
Others			2.6				7.0[d/]						9.6
TOTALS	16.4	4.6	2.8			7.0	48.0		19.2	6.9	7.3		112.2

B. INSECTICIDES	Illinois[b/]	Indiana	Iowa	Kansas[c/]	Michigan[c/]	Minnesota	Missouri	Nebraska[c/]	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Alfa-tox[g/]	[h/]									0.7		[h/]	0.7
Azinphos-methyl										0.7			0.7
Carbaryl	101.3	0.5								1.0			102.8
Carbofuran	18.1												18.1
Diazinon	17.9											21.0	38.9
Dibrom									0.4				0.4
M & M[g/]	88.7		<0.5							1.6			90.8
Malathion	1.1	0.9	0.7							4.4		25.0	32.1
Methidathion	2.0	<0.5								2.5		40.0	45.0
Methoxychlor	17.9									2.0		21.0	40.9

TABLE 33. (continued) Other Hay Acreage Treated with Pesticides by State and Pesticide[a/]

B. INSECTICIDES	Illinois[b/]	Indiana	Iowa	Kansas[c/]	Michigan[c/]	Minnesota	Missouri	Nebraska[c/]	N. Dakota	Ohio	S. Dakota	Wisconsin[b/]	Total
						(1000 Acres)							
Methyl Parathion	3.0									<0.5			3.5
Mevinphos										<0.5			<0.5
Parathion									0.4	0.5			0.9
Phosmet	0.7												0.7
Toxaphene	0.1								0.7				0.8
Others							32.0[e/]				31.8[f/]		63.8
TOTALS	250.8	1.9	1.2				32.0		1.5	14.4	31.8	107.0	440.6

a/Data reported for each individual pesticide applied either separately or in combination on the same acreage.
b/Includes all hay.
c/Data included with alfalfa hay.
d/Less than 0.5% of acreage treated with any specific herbicides including glyphosate, picloram, and profluralin.
e/Less than 0.5% of acreage treated with any specific insecticide including azinphos-methyl, carbaryl, carbofuran, dimethoate, dicofol, malathion, methyl parathion, parathion, and toxaphene.
f/Includes all other acreages treated, but type of treatment and specific pesticide not identified.
g/Some states preferred reporting the pesticide as the combination product while others reported Alfa-tox as the separate diazinon and methoxychlor constituents and M & M as malathion and methoxychlor.
h/Acreage reported for diazinon and methoxychlor.

TABLE 34. Pasture and Rangeland Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Illinois	Indiana	Iowa	Kansas	Michigan[b/]	Minnesota	Missouri[b/]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Ammate				0.9									0.9
Atrazine		1.5											1.5
Bentazon			0.4							0.7			1.1
2,4-D		37.0	439.2	2306.7		96.0	426.0	983.4	172.6	24.2	145.1	36.0	4666.2
2,4-DB	64.0	5.5								3.6			73.1
Dicamba	4.1	18.6	80.5	29.8				185.6	13.2	12.4	1.7		345.9
Glyphosate	0.6	0.7							0.3				1.6
MCPA									8.8				8.8
Paraquat										5.7			5.7
Picloram	0.1		0.9	0.6				89.5	81.2	12.4			184.7
Silvex	2.0			24.2									26.2
Simazine	3.9	0.5											4.4
2,4,5-T	4.6		1.3	719.8			158.0		<0.1	3.8			887.6
Others			50.3				134.0[c/]	163.0	5.4		210.6[e/]		563.3
TOTALS	79.3	63.8	572.6	3082.0		96.0	718.0	1421.5	281.6	62.8	357.4	36.0	6771.0

B. INSECTICIDES	Illinois	Indiana	Iowa	Kansas	Michigan[b/]	Minnesota	Missouri[b/]	Nebraska	N. Dakota	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Carbaryl	9.6							16.0					25.6
Dimethoate	0.7												0.7
M & M										5.0			5.0
Malathion	0.1							129.9					130.0
Methidathion	1.8												1.8
Methyl Parathion	0.4												0.4
Parathion								15.2			21.9		37.1
Phosmet	0.3												0.3
Toxaphene	7.1		1.7					6.5					15.3
Others							186.0[d/]	60.0					246.0
TOTALS	20.0		1.7				186.0	227.6		5.0	21.9		462.2

a/Data reported for each individual pesticide applied separately or in combination on the same acreage.
b/Also includes idle and other land, fence rows, and ditches.
c/Less than 0.5% of acreage treated with any specific herbicide including atrazine, cyanazine, dicamba, glyphosate, MCPA, picloram, alachlor, and trifluralin
d/Insecticides include darbaryl, carbofuran, dimethoate, malathion, parathion, toxaphene, and methomyl.
e/Includes all other treatments but type of treatment and specific pesticide not identified.

TABLE 35. Tobacco Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Indiana	Ohio	Wisconsin	Total
		(1000 Acres)		
Benefin		3.4	3.5	6.9
Benfluralin	1.9			1.9
2,4-D		<0.5		<0.5
Diphenamid		<0.5	1.7	<2.2
EPTC	<0.5	<0.5		<1.0
Pebulate		1.2	0.6	1.8
Simazine		<0.5		<0.5
TOTALS	<2.4	<6.6	5.8	<14.8

B. INSECTICIDES	Indiana	Ohio	Wisconsin	Total
		(1000 Acres)		
Acephate		<0.5		<0.5
Carbaryl	1.7	2.4		4.1
Carbofuran	1.1	<0.5		<1.6
Diazinon	<0.5	0.6	2.8	<3.9
Dimethoate			1.3	1.3
Disulfoton	<0.5	1.1		<1.6
Malathion	<0.5	<0.5		<1.0
Methidathion	1.4			1.4
Trichlorfon		<0.5		<0.5
Others	<0.5[b/]			<0.5
TOTALS	<6.2	<6.1	4.1	<16.4

C. OTHER CHEMICALS	Indiana	Ohio	Wisconsin	Total
		(1000 Acres)		
Maleic Hydrazide	0.8	6.8		7.6
Growth Regulators[c/]			6.0	6.0
TOTALS	0.8	6.8	6.0	13.6

a/Data reported for all individual pesticides applied either separately or in combination on the same acreage.
b/Includes endosulfan, fonofos, methomyl, methyl bromide, and methyl parathion.
c/Identity not indicated.

TABLE 36. Sugarbeet Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Michigan	Minnesota	N. Dakota	Ohio	Total
		(1000 Acres)			
Barban		30.0	12.7		42.7
Cycloate	11.0		6.0	1.4	18.4
2,4-D			2.0		2.0
Dalapon		24.0	14.5		38.5
Desmedipham	16.0		30.7	4.6	51.3
Diallate		80.0	48.7		128.7
Diethatyl			0.1		0.1
Endothall	13.0		2.9	7.1	23.0
EPTC		201.0	103.0	3.8	307.8
Ethofumesate	4.0				4.0
Phenmedipham	8.0		8.9	4.8	21.7
Pyrazon	86.0		15.7	23.6	125.3
Triallate			7.1		7.1
Trichloracetic Acid	71.0		23.7	23.9	118.6
Trifluralin			1.8	3.8	5.6
Others			0.6		0.6
TOTALS	209.0	335.0	278.4	73.0	895.4

B. INSECTICIDES	Michigan	Minnesota	N. Dakota	Ohio	Total
		(1000 Acres)			
Aldicarb		37.0	21.9		58.9
Carbaryl			0.3	< 0.5	< 0.8
Diazinon			2.5		2.5
Fonofos		30.0	16.5		46.5
Phorate			2.8		2.8
Terbufos		29.0	24.6		53.6
Toxaphene			0.1		0.1
Trichlorfon			0.2		0.2
Others		6.0			6.0
TOTALS		102.0	68.9	0.5	171.4

C. FUNGICIDES	Michigan	Minnesota	N. Dakota	Ohio	Total
		(1000 Acres)			
Benomyl			0.3	2.4	2.7
Copper Hydroxide			1.2		1.2
Mancozeb			0.7		0.7
Thiabendazole			2.7		2.7
Triphenyltin Hydroxide			8.1		8.1
TOTALS			13.0	2.4	15.4

a/Data reported for all individual pesticides applied either separately or in combination on the same acreage.

TABLE 37. Sorghum Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Iowa	Kansas	Missouri	Nebraska	S. Dakota	Total
			(1000 Acres)			
Alachlor	6.4		11.0			17.4
Atrazine	4.5	2079.4	706.0	1073.9		3863.8
Cyanazine		94.3	9.0	20.7		124.0
2,4-D	1.5		72.0	270.5	89.6	433.6
Dicamba		34.7				34.7
Glyphosate		2.7				2.7
Linuron	4.5					4.5
Propazine		651.5		11.4		662.9
Propachlor	3.0	1074.0	332.0	856.2	41.1	2306.3
Terbutryn		381.3	16.0			397.3
Others	8.4		13.0[b/]	29.2	33.5[d/]	84.1
TOTALS	28.3	4317.9	1159.0	2261.9	164.2	7931.3

B. INSECTICIDES	Iowa	Kansas	Missouri	Nebraska	S. Dakota	Total
			(1000 Acres)			
Carbaryl	[c/]	126.6	26.0	13.1		165.7
Carbofuran		129.8	9.0	53.6		192.4
Demeton		4.1				4.1
Dimethoate		16.5		25.9	9.1	51.5
Disulfoton		380.4		116.2		496.6
Fonofos				5.6		5.6
Heptachlor		731.0	23.0			754.0
Lindane		64.0				64.0
Malathion		35.2		3.3		38.5
Methyl Parathion		2.2				2.2
Oxydemeton-Methyl		7.3				7.3
Parathion		268.6		165.5		434.1
Phorate		188.8		81.7		270.5
Sulfoton			7.0			7.0
Terbufos	3.0					3.0
Toxaphene		112.0	13.0			125.0
Others		239.2	25.0[b/]	9.9		274.1
TOTALS	3.0	2305.7	103.0	474.8	9.1	2895.6

a/Data reported for each individual pesticide applied either separately or in combination on the same acreage.

b/Less than 0.5% of acreage treated with any specific pesticide. Other herbicides include chloramben, linuron, paraquat, metribuzin, and trifluralin. Other insecticides include diazinon, dimethoate, methomyl, chlorpyrifos, malathion, and parathion.

c/18,200 acres of sorghum, soybeans, wheat, alfalfa and corn treated for grasshopper control but no designation of individual acreages.

d/Includes all other acreage treated but type of treatment and specific pesticide not indicated.

TABLE 38. Dry Bean Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Michigan	N. Dakota	Total
	(1000 Acres)		
Alachlor	25.0	1.0	26.0
Bentazon		0.6	0.6
Chloramben	160.0	2.3	162.3
2,4-D		0.1	0.1
Diallate		0.1	0.1
Dinitramine	40.0	1.7	41.7
Dinoseb	20.5		20.5
EPTC	471.0	26.9	497.9
Linuron		0.1	0.1
Profluralin	26.0	6.2	32.2
Triallate		2.2	2.2
Trifluralin	330.0	73.1	403.1
TOTALS	1072.5	114.3	1186.8

B. INSECTICIDES	Michigan	N. Dakota	Total
	(1000 Acres)		
Disulfoton	16.0		16.0
Lindane		0.2[b/]	0.2
Toxaphene		0.4	0.4
Others		0.2	0.2
TOTALS	16.0	0.8	16.8

C. FUNGICIDES	Michigan	N. Dakota	Total
	(1000 Acres)		
Benomyl		1.4	1.4
Captan		0.2[b/]	0.2
Copper Hydroxide		1.7	1.7
Mancozeb		3.0	3.0
Maneb		12.9[c/]	12.9
Zineb		0.4[b/]	0.4
TOTALS		19.6	19.6

a/Data reported for each individual pesticide applied either separately or in combination on the same acreage.
b/Seed treatment.
c/Includes 1,600 acres reported for seed treatment.

TABLE 39. Flax Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Minnesota	N. Dakota	S. Dakota	Total
		(1000 Acres)		
Asulam	16.0			16.0
Barban		4.5		4.5
Bromoxynil		0.3		0.3
2,4-D		11.6		11.6
Dalapon	31.0	34.3	6.6	71.9
Diallate		0.7		0.7
Dicamba		8.7		8.7
EPTC		38.3		38.3
MCPA	100.0	126.7	69.7	296.4
Triallate		16.7		16.7
Trifluralin		14.9		14.9
Others		2.6		2.6
TOTALS	147.0	259.3	76.3	482.6

B. INSECTICIDES	Minnesota	N. Dakota	S. Dakota	Total
		(1000 Acres)		
Toxaphene		1.2		1.2
Others	4.0		49.0[b/]	53.0
TOTALS	4.0	1.2	49.0	54.2

C. FUNGICIDES	Minnesota	N. Dakota	S. Dakota	Total
		(1000 Acres)		
		[c/]		
HCB		2.1		2.1
Lindane		19.0		19.0
Maneb		21.1		21.1
TOTALS		42.2		42.2

a/Data reported for each individual pesticide applied either separately or in combination on the same acreage.
b/Includes all other acreage treated but no specific pesticide indicated.
c/Seed treatment only, lindane + HCB in combination with maneb.

TABLE 40. Sunflower Acreage Treated with Pesticides by State and Pesticide[a/]

A. HERBICIDES	Minnesota	N. Dakota	S. Dakota	Total
		(1000 Acres)		
Alachlor		2.7		2.7
Barban		4.4		4.4
Chloramben	18.0	24.4		42.4
Cyanazine		0.9		0.9
Diallate		1.7		1.7
Dinitramine		20.0		20.0
EPTC	63.0	304.8		367.8
Fluchloralin		2.0		2.0
Glyphosate		3.8		3.8
Pendimethalin		0.6		0.6
Profluralin		125.2		125.2
Trifluralin	484.0	1365.6	33.9	1883.5
Triallate		53.1		53.1
Others		16.4		16.4
TOTALS	565.0	1925.6	33.9	2524.5

B. INSECTICIDES	Minnesota	N. Dakota	S. Dakota	Total
		(1000 Acres)		
Endosulfan	15.0			15.0
Hexachlorobenzene		6.2[b/]		6.2
Lindane		76.4[b/]		76.4
Malathion			4.2	4.2
Methidathion		9.9	6.1	16.0
Methyl Parathion		6.8		6.8
Toxaphene	32.0	32.6		64.6
Others		0.3		0.3
TOTALS	47.0	132.2	10.3	189.5

C. SEED TREATMENT	Minnesota	N. Dakota	S. Dakota	Total
		(1000 Acres)		
Captan		72.6		72.6
Maneb		10.0		10.0
TOTALS		82.6		82.6

D. OTHER CHEMICALS	Minnesota	N. Dakota	S. Dakota	Total
		(1000 Acres)		
			45.9[c/]	45.9
4-AP		1.5		1.5
Paraquat		48.7		48.7
Sodium Chlorate		0.8		0.8
TOTALS		51.0	45.9	96.9

a/Data reported for each individual pesticide applied either separately or in combination on the same acreage.
b/Used for seed treatment in combination with captan and/or maneb.
c/Includes all other acreage treated but no treatment nor pesticide identification indicated.

TABLE 41. Summary of Herbicide Usage by State and Herbicide[a/]

HERBICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri[b/]	Nebraska	N. Dakota[b/]	Ohio	S. Dakota	Wisconsin	Total
	(1000 lbs. Active Ingredient)												
Alachlor	12838.3	9159.3	16344.9	1502.9	2791.0	9059.0	6991.0	4262.0	210.3	7073.7	1106.2	3036.0	74374.6
Ametryn		7.0								0.9			7.9
Asulam						33.4							33.4
Atrazine	12932.8	7936.6	5966.2	3770.0	3349.0	3053.0	3918.0	7250.8	93.8	4451.0	14.9	4410.0	57146.1
Barban						341.4			168.4				509.8
Benefin				3.4			2.0			7.2		4.6	17.2
Benfluralin		8.1											8.1
Bentazon	268.9	373.2	334.7	67.6	60.0	229.0	799.0	38.3	10.9	251.9		16.0	2449.5
Bifenox	36.4	8.9	95.8	37.2			67.0			16.9			262.2
Bromoxynil				7.7		55.5			12.6				75.8
Butylate	14453.0	3327.6	9454.9	878.9	1091.0	3129.0	654.0	1849.9	4.7	1775.4	84.4	782.0	37483.8
Chloramben	1442.2	291.7	1051.1	106.6	205.0	1372.2	264.0	182.8	31.3	981.3	14.5		5942.7
Chlorbromuron	4.3	28.3		8.6						18.5			59.7
Chlorpropham	117.3	7.4	284.2							4.2			413.1
Chloroxuron		1.5	--										1.5
Cyanazine	2049.4	635.4	6027.3	371.9	840.0	2260.5	671.0	1054.0	160.3	1142.4	32.6	726.0	15970.8
Cycloate					100.0				6.7	4.2			110.9
2,4-D	999.8	213.4	1645.5	5168.1	184.7	1512.5	881.0	572.7	3942.7	321.3	1454.9	154.0	17050.6
2,4-DB	2.3	6.6		0.6						29.1			38.6
Dalapon						97.7			118.4				216.1
Desmedipham					7.0				15.2	0.7			22.9
Dextrone		6.2											6.2
Diallate									104.5				104.5
Dicamba	230.8	110.5	759.1	95.1	46.0	342.0	5.0	95.8	50.2	145.0	35.2	53.0	1967.7
Diclofop									1.3				1.3
Diethatyl									0.1				0.1
Difenzoquat									41.7				41.7
Dinitramine	2.4	4.7	11.4	0.8	92.0				11.7				123.0
Dinoseb	21.1	29.7			49.0					30.2			130.0
Diphenamid												7.5	7.5
Diuron				2.9									2.9
DNBP							167.0						167.0
Endothall					3.0			1.4	1.8				6.2
EPTC	339.7	623.1		1639.0	306.0	856.3	269.0	770.0	1300.0	368.6	23.8	238.0	6733.8
EPTC + R-25788			264.0						95.7				359.7
Ethofumesate					3.0								3.0

TABLE 41. (continued)

Summary of Herbicide Usage by State and Herbicide[a/]

HERBICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri[b/]	Nebraska	N. Dakota[b/]	Ohio	S. Dakota	Wisconsin	Total
	(1000 lbs. Active Ingredient)												
Fluchloralin	130.5	119.1	91.2	1.8				5.6	0.5	41.4	a/		390.1
Fluometuron							89.0						89.0
Glyphosate	0.8	14.7	15.2	19.3			92.0		7.7	28.0			177.7
Linuron	684.7	670.2	424.7	100.7	290.0	168.3	899.0	80.9	1.9	783.6		59.0	4163.0
MCP							5.0						5.0
MCPA	0.3	6.9	5.4		45.8	663.3			727.6	18.2	162.0	66.0	1695.5
Metolachlor	662.0	782.8	180.9	20.8	108.0	119.8	80.0	101.0	5.3	292.7			2353.3
Metribuzin	2395.5	975.3	1798.9	192.3	100.0	198.4	834.0	138.6	2.7	779.7	1.6	27.0	7443.1
Naptalam	4.7						232.0			1.3			238.0
Naptalam & Dinoseb	204.0	432.5	44.5	22.1						157.4			860.5
Oryzalin	30.6	34.2	28.9	37.1			167.0			15.6			313.4
Paraquat	54.1			0.7			50.0		0.3	49.6			154.6
Pebulate										5.5			5.5
Pendimethalin	155.5	68.3	78.1	49.0				14.6	6.4	139.1			511.0
Penoxalin							45.0						45.0
Phenmedipham					2.0				4.7	0.9			7.6
Picloram	0.4		0.3	2.4				0.3	91.5	11.5	3.1		109.5
Profluralin	157.7	60.0	482.6	37.9	15.0	118.8	188.0	33.4	115.0	26.2		7.0	1241.6
Pronamide	2.2	0.7								3.0			5.9
Propachlor	703.9	226.1	1619.7	3791.5		1217.7	742.0	1984.8		27.9	398.2		10711.8
Propanil									22.8				22.8
Propazine				857.6				9.1					866.7
Propham				26.6									26.6
Pyrazon					110.0				43.3	29.5			182.8
Silvex	8.0			48.5									56.5
Simazine	316.9	312.0		46.1				98.8		240.4			1014.2
Terbacil				1.0									1.0
Terbutryn				659.8			22.0						681.8
Triallate						510.0			1063.3				1573.3
Trichloracetic Acid					82.0				69.8	58.3			210.1
2,4,5-T	0.4		0.5	1256.4			233.0			16.4			1506.7
Trifluralin	5469.4	1552.9	3875.2	691.0	779.0	2255.2	2372.0	257.9	1487.3	751.5	83.2	23.0	19596.8
Vernolate	337.6	53.2	36.5							15.7			454.3
Others	0.5	23.3	35.5	50.3					11.3				120.9
TOTALS	57058.4	28109.4	50957.2	21574.2	10658.5	27593.0	20738.0	18802.7	10044.0	20115.9	3414.6	9609.1	278675.0

a/Includes multiple applications.
b/Includes treatment of cotton in Missouri and potatoes in North Dakota.

TABLE 42. Summary for Acreage of Herbicide Usage by State and Herbicide

HERBICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri[b/]	Nebraska	N. Dakota[b/]	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Alachlor	6990.5	4825.8	8397.0	705.7	1571.0	4456.0	4061.0	2434.5	150.2	3714.0	861.0	1633.0	39799.7
Ametryn		4.0								0.8			4.8
Amino triazole										<0.5			<0.5
Ammate				0.9									0.9
Asulam						16.0							16.0
Atrazine	8954.7	5154.6	6336.0	3541.0	2080.0	1404.5	2755.0	5352.1	61.9	2747.5	7.5	3000.0	41393.9
Barban						510.0			624.2				1134.2
Benefin	1.5			3.0				1.8		7.4		3.5	17.2
Benfluralin		4.4											4.4
Bentazon	358.9	366.5	334.8	68.0	35.0	229.0	824.0	38.3	16.9	224.7		11.0	2507.1
Bifenox	28.4	5.8	76.0	22.6			71.0			14.1			217.9
Bromoxynil				23.2		111.0			47.9				182.1
Butylate	4419.8	1017.6	3820.5	290.3	353.0	540.0	197.0	564.0	2.7	497.3	24.1	229.0	11955.3
Chloramben	1403.0	260.9	1026.0	53.3	885.0	1056.0	193.0	97.6	39.0	810.8	14.1	38.0	5876.7
Chlorobromuron	6.2	25.7		6.8						14.7			53.4
Chloroxuron		1.2											1.2
Chlorpropham	45.8	3.7	266.0							4.2			319.7
Cyanazine	1306.6	432.7	3955.5	242.4	535.0	820.0	463.0	699.7	127.5	680.2	23.3	443.0	9728.9
Cycloate					11.0				6.0	1.4			18.4
2,4-D	2396.6	462.7	3691.4	3502.3	355.0	3317.0	784.0	2123.0	9339.1	703.2	3097.8	228.0	30000.1
2,4-DB	83.1	17.4	439.2							33.6			573.3
Dalapon						55.0			48.8		6.6		110.4
Desmedipham					16.0				30.7	4.6			51.3
Dextrone		11.6											11.6
Diallate						80.0			72.1				152.1
Dicamba	683.8	217.2	2766.7	218.3	144.0	1482.0	23.0	469.5	205.4	592.9	180.1	83.0	7065.9
Diclofop									1.7				1.7
Diethatyl									0.1				0.1
Difenzoquat									66.9				66.9
Dinitramine	5.4	4.2	22.8	1.6	40.0				24.4				98.4
Dinoseb	5.1	16.1			20.5					19.7			61.4
Diphenamid										0.5		1.7	2.2
Diuron				1.8			18.0						19.8
DNBP							235.0						235.0
DSMA							34.0						34.0
Endothall					13.0				2.9	7.1			23.0

TABLE 42. (continued)

Summary for Acreage of Herbicide Usage by State and Herbicide[a/]

HERBICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri[b/]	Nebraska	N. Dakota[b/]	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
EPTC	112.0	163.0			471.0	267.0	76.0		490.4	73.8		60.0	1713.2
EPTC + R-25788			54.0	349.0		92.0		216.9	27.7		6.6		746.2
Ethofumesate					4.0								4.0
Fluchloralin	169.5	96.8	76.0	1.8				6.2	2.6	35.4			388.3
Fluometuron							150.0						150.0
Glyphosate	1.3	9.2	15.2	5.5			37.0		9.2	20.9			98.3
Linuron	1287.1	976.3	478.2	92.9	377.0	198.0	1450.0	117.4	1.6	1136.1		79.0	6193.6
MCP							22.0						22.0
MCPA	1.5	21.0	15.3		112.5	1980.0			1827.7	40.5	441.0	132.0	4571.5
Metolachlor	316.7	410.3	81.0	12.8	67.0	68.0	44.0	67.3	4.9	163.9			1235.9
Metribuzin	5032.7	1702.6	3078.0	449.6	208.0	508.0	1909.0	385.9	12.7	1470.4	5.4	46.0	14808.3
MSMA							131.0						131.0
Naptalam	4.7						174.0			1.6			180.3
Naptalam + Dinoseb	64.6	133.5	15.2	9.8						62.2			285.3
Oryzalin	34.3	233.5	15.2	50.8			153.0			17.5			304.3
Paraquat	122.3			2.8			58.0		0.3	97.9			281.3
Pebulate										1.2		0.6	1.8
Pendimethalin	117.8	48.3	65.0	43.1				14.4	7.8	103.6			400.0
Penoxalin							39.0						39.0
Phenmedipham					8.0				8.9	4.8			21.7
Picloram	0.1		0.9	0.6				89.5	374.2	12.4	30.9		508.6
Profluralin	160.9	58.3	478.8	48.4	26.0	132.0	143.0	56.5	147.0	27.2		6.0	1284.1
Pronamide	3.5	0.7								3.6			7.8
Propachlor	417.5	74.6	529.5	1122.7		615.0	350.0	1121.6	0.5	15.5	273.6		4520.5
Propanil									18.0				18.0
Propazine				651.5				11.4					662.9
Propham				7.6									7.6
Pyrazon					86.0				15.7	23.6			125.3
Silvex	2.0			24.2									26.2
Simazine	301.4	247.1		38.4				48.9		184.3			820.1
Terbacil				1.2						<0.5			1.7
Terbutryn				381.3			16.0						397.3
Triallate						510.0			1045.9				1555.9
Trichloracetic Acid					71.0				23.7	23.9			118.6
2,4,5-T	8.2		1.3	719.8			175.0			12.9			917.2
Trifluralin	5818.0	1462.5	4385.2	551.2	452.0	2247.0	2180.0	331.6	2052.4	717.7	117.1	27.0	20341.7
Vernolate	143.7	17.8	53.2							6.1			220.8
Others		27.0	101.2				369.0	328.2	99.1		295.5		1220.0
TOTALS	40809.2	18321.9	40567.8	13246.2	7941.0	20693.5	17134.0	14576.3	17038.7	14336.7	5384.6	6020.8	216070.7

a/Includes multiple applications.
b/Includes cotton acreage in Missouri and potato acreage in North Dakota.

TABLE 43. Summary of Insecticide Usage by State and Insecticide[a/]

INSECTICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri[b/]	Nebraska	N. Dakota[b/]	Ohio	S. Dakota	Wisconsin	Total
	(1000 lbs. Active Ingredient)												
Acephate		0.9								0.4			1.3
Aldicarb						37.0			74.7				111.7
Aldrin										0.8			0.8
Alfa-tox[c/]	54.6	9.9	17.5	6.7						25.0		21.0	134.7
Azinphos-methyl	15.6	1.7		3.2	9.0		2.0		108.9	8.7			149.1
BHC		6.6											6.6
Bufencarb										0.6			0.6
Carbaryl	215.3	177.0	129.6	582.0	111.0		91.0	237.4		81.1			1624.4
Carbofuran	1676.8	1610.1	1380.6	525.4	549.0	642.0	528.0	1171.4	10.6	921.8	87.8	351.0	9454.5
Carbophenothion		0.6		3.6									4.2
Chlordane	73.1	35.1	12.1						5.7	42.9			168.9
Chlorpyrifos	441.3	100.7	259.2				192.0	82.9		43.0	19.4		1138.5
Demeton				1.0									1.0
Diazinon	47.4	7.2	21.3	55.1				21.0	4.6	16.3		3.4	176.3
Dimethoate	8.9	3.4		80.1				42.8		20.6	2.7	0.7	159.2
Disulfoton		3.2		433.2	14.0			127.6	50.8	18.9			647.7
Endosulfan									24.9				24.9
Endrin				0.5				0.4					0.9
Ethion				23.9									23.9
Ethoprop	316.1	91.4	259.1			87.1	75.0	139.0		13.2			980.9
Fensulfothion	1.1		5.3										6.4
Fonofos	2694.6	682.6	1992.2	323.5	684.0	640.3	74.0	1075.9	24.3	341.6	152.0	263.0	8948.0
Hexachlorobenzene									0.5	2.0			2.5
Heptachlor		3.8	16.9	251.7			93.0			9.5			374.9
Lindane				7.4					0.3	2.8			10.5
M & M [c/]	70.1	18.5		2.1									90.7
Malathion	9.6	19.4	73.1	91.0			51.0	200.8		66.9	4.2	30.0	546.0
Methamidophos									1.1				1.1
Methidathion	0.9	13.7		4.0			8.0			22.2	3.0	28.0	79.8
Methomyl	1.2	0.6											1.8
Methoxychlor	62.3	1.4		0.2			2.0			37.7			103.6
Methyl Parathion	0.2	4.2	15.0	18.2			38.0		1.0	12.7			89.3
Mevinphos										0.7			0.7
Monocrotophos									4.7				4.7
Oxydemeton-Methyl		0.2		86.0						0.5			86.7
Parathion		1.7		413.6			46.0	284.3		5.7	33.2		784.5
Phorate	767.0	75.9	1168.4	503.1	81.0	382.5	29.0	1113.9	58.3	50.8	121.0	627.0	4977.9
Phosmet	0.5			1.9			15.0			0.8			18.2
Phosphamidon									22.3				22.3
Propargite				172.2									172.2
Sulfoton							11.0						11.0
Terbufos	2838.5	433.0	1799.2	330.8	94.0	581.8	172.0	1150.4	25.6	460.8	26.3	504.0	8416.4
Thiodan				3.4									3.4
Toxaphene	282.7	27.9	80.9	831.8			141.0	75.7	89.9	6.7	27.1		1563.7
Trichlorfon	1.2	1.4								0.5			3.1
Others				49.0		155.0	821.0						1025.0
TOTALS	9579.0	3332.1	7230.4	4804.6	1542.0	2525.7	2389.0	5723.5	508.2	2215.2	476.7	1828.1	42154.5

a/Includes multiple application.

b/Includes insecticides applied to cotton in Missouri and potatoes in North Dakota.

c/Some states preferred reporting the pesticide as the combination product while other reported Alfa-tox as the separate diazinon and methoxychlor constituents and M & M as malathion and methoxychlor.

TABLE 44.

Summary of Acreage Treated with Insecticides by State and Insecticide[a/]

INSECTICIDES	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri[b/]	Nebraska	N. Dakota[b/]	Ohio	S. Dakota	Wisconsin	Total
						(1000 Acres)							
Acephate		0.9								0.1			1.0
Aldicarb						37.0			31.3				68.3
Aldrin										0.6			0.6
Alfa-tox		7.4	29.2							28.7			65.3
Azinphos-methyl	20.8	2.7		4.2	23.0		3.0		72.8	13.7			140.2
BHC		8.7											8.7
Bufencarb										0.4			0.4
Carbaryl	237.1	164.8	98.8	270.0	100.0		71.0	301.0	4.6	64.9			1312.2
Carbofuran	1726.9	1565.0	1571.8	574.7	560.0	738.0	529.0	1435.4	12.4	963.4	109.7	413.0	10199.3
Carbophenothion		1.2		3.6									4.8
Chlordane	31.5	18.2	12.1						4.9	22.5			89.2
Chlorpyrifos	391.5	81.2	260.0	4.8			130.0	57.5		42.2	17.6		984.8
Demeton				4.1									4.1
Diazinon	112.3	17.6	39.0	47.5				17.5	2.5	39.9		23.8	300.1
Dibrom									0.4				0.4
Dimethoate	12.3	4.3		120.5				92.6		23.5	9.1	1.3	263.6
Disulfoton	13.1	3.9		449.4				128.9	21.3	17.1			633.7
Endosulfan						15.0			11.1				26.1
Endrin				4.6				1.2					5.8
EPN				69.0									69.0
Ethion				23.9									23.9
Ethoprop	168.4	87.9	321.9			105.0	93.0	152.7	1.4	14.7			945.0
Fensulfothion	1.1		6.4										7.5
Fonofos	2200.3	620.5	1862.4	323.5	575.0	568.0	140.0	1250.8	17.7	335.9	138.2	289.0	8321.3
Hexachlorobenzene				848.8[c/]					49.5	5.5			903.8
Heptachlor	2.7	3.8	30.4	1301.3[c/]			58.5			17.5			1414.2
Lindane				287.8[c/]					932.1[c/]	71.8			1291.7
M & M	88.7	8.2								26.0			122.9
Malathion	15.2	15.6	5.5	70.5			21.0	194.7	6.3	40.3	4.2	25.0	398.3
Methamidophos									0.7				0.7
Methidathion	3.8	16.5		7.9			16.0		9.9	34.4	6.1	40.0	134.6
Methomyl	2.6	2.0											4.6
Methoxychlor	17.9	8.1		3.3			4.0			18.6		10.5	62.4
Methyl Parathion	4.5	6.7	20.2	37.2			67.0		18.7	26.7			181.0
Mevinphos										0.9			0.9
Monocrotophos									15.1				15.1
Oxydemeton-Methyl		1.0		153.9						2.6			157.5
Parathion		1.7		470.2			32.0	440.9	2.6	9.2	76.6		1033.2
Phorate	701.1	60.2	1141.7	483.6	67.0	340.0	36.0	964.0	30.6	48.8	123.2	615.0	4611.2
Phosmet	1.0			1.9			17.0			0.8			20.7
Phospnamidon									9.1				9.1
Propargite				110.9									110.9
Sulfoton							7.0						7.0
Terbufos	2512.0	376.5	1763.9	330.8	82.0	478.0	176.0	954.4	24.6	407.8	26.3	450.0	7582.3
Thiodan				6.7									6.7
Toxaphene	86.2	24.3	33.1	234.7	16.0	71.0	65.0	44.7	65.1	7.3	17.5		664.9
Trichlorfon	1.5	1.3					16.0		0.2	0.8			19.8
Others			62.4	630.4		205.0	657.0	236.8	4.9		107.5		1904.0
TOTALS	8352.5	3110.2	7258.8	6879.7	1423.0	2557.0	2138.5	6273.1	1349.8	2286.6	636.0	1867.6	44132.8

a/Includes multiple application.
b/Includes insecticide application to cotton in Missouri and potatoes in North Dakota.
c/Includes acreage being planted with seed treated with the respective pesticides.

TABLE 45. Summary of Fungicide and Other Chemical Usage[a/,b/]

CHEMICAL	ACRES TREATED (1000 Acres)	QUANTITY APPLIED (1000 pounds Active Ingredient)
A. FUNGICIDES		
Benomyl	31.0	14.1
Captafol	5.0[d/]	11.7
Carboxin	1298.4[d/]	11.7
Captan	851.2[d/]	14.9
Chlorothalonil	4.2	3.2
Copper Hydroxide	2.9[d/]	[e/]
Hexachlorobenzene[c/]	891.5[d/]	2.8
Mancozeb	45.9[d/]	188.3
Maneb	1598.7[d/]	148.9
Mercury	117.5[d/]	14.2
Terrazole	140.1[d/]	[e/]
Thiabendazole	25.6	13.4
Thiram	185.5	13.2
Triphenyltin Hydroxide	8.1	1.4
Zineb	3.0	[e/]
Others	451.5	82.4
TOTALS	5670.1[f/]	520.2[f/]
B. OTHER CHEMICALS		
4-AP	16.0	0.1
Maleic Hydrazide	7.6	28.0
Methiocarb	0.5	0.1
Paraquat (Desiccant)[g/]	48.7	41.8
Sodium Chlorate (Desiccant)	0.8	5.1
TOTALS	73.6	75.1

a/See Tables 1 and 2 for cropland and pastureland acreages treated with fungicides and other chemicals.

b/Includes multiple applications.

c/Data also entered in summary table for insecticides.

d/Acreage is primarily that planted with treated seed with the majority of the percentage not reporting quantities of fungicides used.

e/Quantity too small to be reported.

f/Part of the total acreage as indicated in note d/is included in the reporting of 5,998,000 acres that were treated for which no quantities of pesticides were reported and contributed to a grand total of 7,182,100 acres treated with fungicides and other chemicals calculated from all available data in the individual state survey bulletins. As indicated in note d/ the acreage for the majority of chemical usage consisted primarily of that planted with treated seed rather than soil or stand crop application.

g/Data also entered in summary table for herbicides.

TABLE 46. Percent of Farm Operators Reporting Use of Protective Clothing or Equipment When Handling or Applying Pesticides

State	Respirator	Spray Suit Other Protective Clothing	Rubber Gloves and Boots	Goggles	Protective Cab on Tractor
			(Percent)		
Illinois	13	24	53	32	28
Indiana	12	7	39	22	27
Iowa[a/]					
Kansas	16	8	40	26	28
Michigan[a/]					
Minnesota	14	8	52	30	46
Missouri	17	11	46	25	18
Nebraska[a/]					
Ohio	16	10	42	23	17
North Dakota	16	14	64	27	27
South Dakota	10	4	37	10	30
Wisconsin	19	14	51	26	13
TOTALS[b/]	16	12	46	24	23

a/Data not available.
b/Calculations based upon data from states reporting.

TABLE 47. Percent of Farm Operators Reporting the Following:

State	Certified Applicator on Farm	Potential Water Contamination Requires Special Attention	Uses Irrigation	Apply Pesticides Through Irrigation
		(Percent)		
Illinois[a]				
Indiana	60	6	2	0
Iowa	60	a	a	a
Kansas	54	6	21	2
Michigan[a]				
Minnesota	38	1	3	0
Missouri	56	5	4	5
Nebraska	70	a	a	a
Ohio	66	5	2	0
North Dakota	68	5	3	5
South Dakota	44	a	a	a
Wisconsin	55	4	3	2
TOTALS[b]	57	5	3	2

a/Data not available.
b/Calculations based upon data from states reporting.

TABLE 48. Method of Disposing of Pesticide Containers Used on Farms

State	Percent of Farmers Reporting by Method of Disposal[e/]				
	Reused on Farm	Burned on Farm	Buried on Farm	Hauled to Landfill or Dump	Other
	(Percent)				
Illinois	a/	30	13	21	35[d/]
Indiana	2	36	23	23	16
Iowa	1	22	12	26	39
Kansas	3	40	46	6	4
Michigan[a/]					
Minnesota[b/]	3	43	33	36	17[c/]
Missouri	5	46	41	a/	8[c/]
Nebraska	5	a/	41	24	30
Ohio	2	45	26	36	13
N. Dakota	7	12	57[c/]	a/	24[c/]
S. Dakota	2	22	21	55	a/
Wisconsin	2	46	31	a/	21
TOTALS[f/]	3	35	33	26	19

a/Question not asked.
b/1979 Survey results instead of 1978.
c/Includes buried in landfill.
d/Includes container rendered non usable by puncturing; those returned to the dealer/manufacturer for recycling, etc.; and all other means of disposal.
e/Percentage reported for each state may total more than 100 because farmers may have utilized more than one method for disposal.
f/Calculations based upon data from states reporting.

TABLE 49. Types of Nozzles Used in Spraying

State	Percent of Farmers Reporting By Type of Nozzle[b]					
	Even Flat Fan	Regular Flat Fan	Solid Cone	Hollow Cone	Flood Jet or Flooding Fan	Other
	(Percent)					
Illinois[a]						
Indiana	17	34	4	15	27	3
Iowa[a]						
Kansas[a]						
Michigan[a]						
Minnesota[a]						
Missouri	--	89	2	--	4	5
Nebraska[a]						
Ohio	14	44	2	7	33	--
North Dakota	--	71		23	15	
South Dakota[a]						
Wisconsin	1	8	49	3	39	--
TOTALS[c]	7	45	8	10	26	1

a/Data not available.
b/Some farmers reported using more than one type of nozzle.
c/Calculations based upon data from states reporting.

APPENDIX I

OHIO CROP REPORTING SERVICE
Room 608 Federal Bldg
200 North High St
Columbus, Ohio 43215
Phone (614) 469-5590

Cooperative Extension Service

COLLEGE OF AGRICULTURE AND HOME ECONOMICS OF THE OHIO STATE UNIVERSITY AND THE UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

1978 OHIO PESTICIDE USE SURVEY

November 1978

Dear Reporter:

The use of pesticides is of major importance in modern agriculture and it is essential that those which are necessary for most effective crop production continue to be available when and where needed. This can be done only by providing information in defense of their use. This survey will help provide such answers by indicating which pesticides are used; on what crops; and in what quantities as well as procedures of application.

Your cooperation by answering the following questions is important in measuring the importance of pesticides to agriculture in Ohio. Your reply is kept confidential and used only to obtain area, State, or regional totals.

Respectfully,

Homer L. Carter
Agricultural Statistician in Charge

Ted L. Jones, Assistant Director,
Agricultural Industry

REPORT FOR THE FARM YOU OPERATE (Include land rented from others)

1978 CROP 98	Total Acres Planted		How Many Acres Were Treated For *							
			Weed Control (Herbicides)		Insect Control (Insecticides)		Disease Control (Fungicides)		Other Control (Defolients, regulators, etc.)	
Field Corn		001		002		003		004		005
Soybeans		006		007		008		009		010
Wheat		011		012		013		014		015
Other Small Grains (Oats, Barley, Rye)		016		017		018		019		020
Alfalfa Hay		021		022		023		024		025
Other Hay		026		027		028		029		030
Tobacco		036		037		038		039		040
Pasture		041		042		043		044		045
Other Crops (Specify)_____		046		047		048		049		050
Total Acres of All Land Not Reported Above		051	*Exclude seed already treated when purchased.							
TOTAL ACRES OPERATED		052								

SPECIAL INSTRUCTIONS

1. Please refer to the enclosed list for names of pesticides used.
2. If more than one rate of application was used for a chemical, report each rate on a separate line
3. If two or more chemicals were applied in combination (during one application), report each chemical on a separate line.

CHEMICAL USED IN 1978 (see enclosed reference sheet)	Chemical Code (Office use)	Formulation* (active ingredient)	Acres Treated	Quantity of Undiluted Product Used Per Acre Each Application				Office Use	Number of Applications	Applicator		Method of Application			Specific Target (Specify major insect, weed, or disease to be controlled)	Office Use
				Wettable Powder	Granular	Liquid	Other			Self	Commercial	Aerial	Ground			
													Surface	Incorporated		
List			ac.	lbs.	lbs.	qts.	specify		no.	(4)			(4)		list	
1	2	4	1] 5	6	7	8	9	2] 10	3] 11	4] 12	13	14	5] 15	16	17	6] 18 7] 19
Example Atrex		80%	50	1½	—	—	—		1	✓			✓		Foxtail	
01 CORN - HERBICIDES																
01 CORN - INSECTICIDES																
01 CORN - OTHER CHEMICALS																
02 SOYBEANS - HERBICIDES																
02 SOYBEANS - INSECTICIDES																
02 SOYBEANS - OTHER CHEMICALS																

*Formulation or concentration of active ingredient as shown on product label. Example: AAtrex 80W or 4L. See enclosed list of commonly used pesticides.

CHEMICAL USED IN 1978 (see enclosed reference sheet)	Chemical Code (Office use)	Formulation* (active ingredient)	Acres Treated	Quantity of Undiluted product Used Per Acre Each Application					Number of Applications	Applicator		Method of Application			Specific Target (Specify major insect, weed, or disease to be controlled)	Office Use
				Wetable Powder	Granular	Liquid	Other	Office Use		Self	Commercial	Aerial	Ground: Surface	Ground: Incorporated		
list			ac.	lbs.	lbs.	qts.	specify		no.	(✓)			(✓)		list	
1	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18 19
03 **WHEAT** - Insecticides, Herbicides, and Other Chemicals																
04 **OTHER SMALL GRAINS** (specify) - Insecticides, Herbicides, and Other Chemicals																
Grain / Chemical																
05 **ALFALFA HAY** - Insecticides, Herbicides, and Other Chemicals																
OTHER HAY - Insecticides, Herbicides, and Other Chemicals																
07 **PASTURE** - Insecticides, Herbicides, and Other Chemicals																
08 **TOBACCO** - Insecticides, Herbicides, and Other Chemicals																

*Formulation or concentration of active ingredient as shown on product label. Example: AAtrex 80W or 4L. See enclosed list of commonly used pesticides.

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1. Was any of the following protective clothing or equipment used when handling or applying pesticides this year? Please indicate with checks. (✓)

	Yes	List chemicals if yes		No	
a. Respirator	☐			☐	060
b. Spray suit or other protective clothing	☐			☐	061
c. Rubber gloves and boots	☐			☐	062
d. Goggles	☐			☐	063
e. Protective cab on tractor	☐			☐	064

	Yes	No	
2. Are you or any person on your farm a certified applicator (that is a holder of a certification permit)?	☐	☐	065
3. Is the potential contamination of streams, ponds, lakes or ground water a problem requiring special attention on your farm?	☐	☐	066
4. Do you use irrigation in your production of crops?	☐	☐	067
If yes, do you apply pesticides to crops by introducing the chemical into the irrigation system?	☐	☐	068

5. What type(s) of nozzles was (were) used in spraying ..... (Specify)_____ 069
(Examples: Even flat fan, regular flat fan, flood jet, solid cone, hollow cone).

6. What was done with the empty pesticide containers?

☐ Burned on farm ☐ Used for other purposes ..... (Specify)_____ 070

☐ Buried on farm ☐ Other (junk, salvage, etc.) ..... (Specify)_____ 071

COMMENTS: _____

_____

_____

Name_____ Phone No. (_____)_____ Date_____

APPENDIX II

Glossary of Pesticides by Common and Trade Names

COMMON NAME	FAMILIAR TRADE NAME[a/]
Alachlor	LASSO
Ametryn	EVIK
Amino triazole	AMITROLE
Ammonium sulfamate	AMMATE
Asulam	ASULOX
Atrazine	AATREX, ATRAZINE
Barban	CARBYNE
Benfluralin	BALAN, BENEFIN
Bentazon	BASAGRAN
Bifenox	MODOWN
Bromoxynil	BROMOXYNIL
Butylate	SUTAN +
Chloramben	AMIBEN
Chlorbromuron	MALORAN, BROMEX
Chlorpropham	CHLORO IPC, FURLOE
Chloroxuron	TENORAN, NOREX
Cyanazine	BLADEX
Cycloate	RO-NEET
2,4-D	Several Names
2,4-DB	BUTOXONE, BUTYRAC
Dalapon	BASFAPON, DOWPON
Desmedipham	BETANEX
Diallate	AVADEX
Dicamba	BANVEL
Diclofop	HOELON
Diethatyl-ethyl	ANTOR
Difenzoquat	AVENGE
Dinitramine	COBEX
Dinoseb	PREMERGE 3, DINITRO, DNBP
Diphenamid	ENIDE
Diuron	KARMEX
DSMA	ANSAR, WEED-E-RAD
Endothall	AQUATHOL, DES-I-CATE, H-273
EPTC	EPTAM, ERADICANE
Ethofumesate	NORTRON
Fluchloralin	BASALIN
Fluometuron	COTORAN
Glyphosate	ROUNDUP
Linuron	LOROX
MCPA	BRONATE, CHIPTOX, RHONOX, RHOMENE
MSMA	MESAMATE, ANSAR, DACONATE
Metolachlor	DUAL
Metribuzin	LEXONE, SENCOR

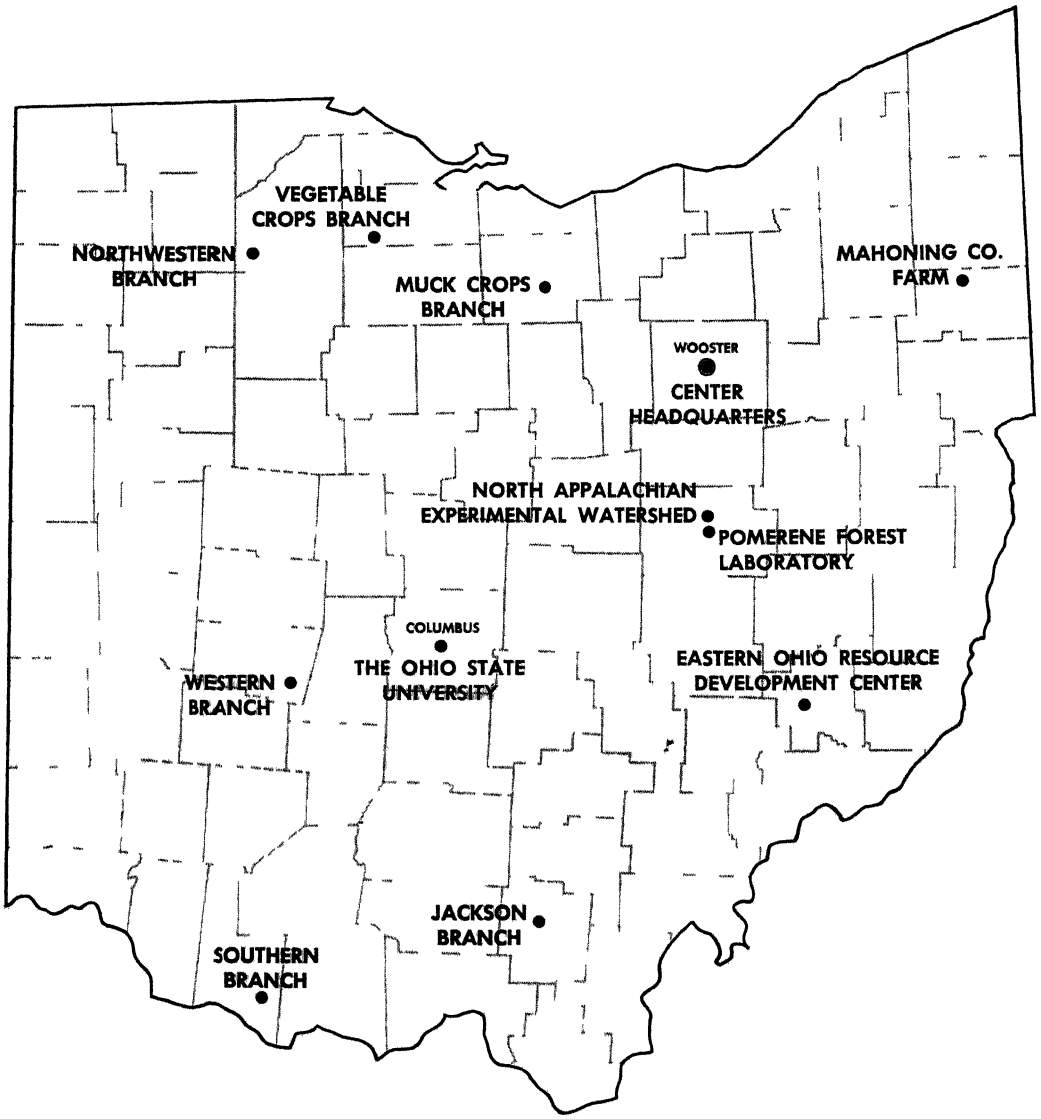
COMMON NAME	FAMILIAR TRADE NAME[a/]
Naptalam	ALANAP
Naptalam & dinoseb	DYANAP
Oryzalin	SURFLAN
Paraquat	ORTHO PARAQUAT CL
Pebulate	TILLAM
Pendimethalin	PROWL
Phenmedipham	BETANAL
Picloram	TORDON
Profluralin	TOLBAN
Pronamide	KERB
Propachlor	RAMROD, BEXTON
Propanil	VERTAC, STAM, PROPANIL
Propazine	MILLOGARD
Propham	IPC, CHEMHOE
Pyrazon	PYRAMIN
Silvex	DED-WEED, WEED-B-GONE, 2,4,5-TP
Simazine	PRINCEP
2,4,5-T	Several Names
Terbacil	SINBAR
Terbutryn	IGRAN
Triallate	FAR-GO
Trichloracetic acid	SODIUM TCA
Trifluralin	TREFLAN
Vernolate	VERNAM
	INSECTICIDES
Acephate	ORTHENE
Aldicarb	TEMIK
Aldrin	ALDRIN
Azinphos-methyl	GUTHION
BHC	ISOTOX, HEXACHLOR
Bufencarb	BUX
Carbaryl	SEVIN
Carbofuran	FURADAN
Carbophenothion	TRITHION
Chlordane	CHLORDANE
Chlorpyrifos	LORSBAN
Demeton	SYSTOX
Diazinon	SPECTRACIDE, DIAZINON
Diazinon + methoxychlor	ALFA-TOX
Dimethoate	CYGON
Disulfoton	DI-SYSTON
Endosulfan	THIODAN
Endrin	ENDREX
EPN	
Ethion	
Ethoprop	MOCAP

COMMON NAME	FAMILIAR TRADE NAME[a/]
INSECTICIDES	
Fensulfothion	DASANIT
Fonofos	DYFONATE
Heptachlor	HEPTACHLOR
Lindane	LINDANE
Malathion	CYTHION
Methidathion	SUPRACIDE
Methamidophos	MONITOR
Methomyl	LANNATE, NUDRIN
Methoxychlor	MARLATE
Methyl parathion	METHYL PARATHION, PENNCAP M
Mevinphos	PHOSDRIN
Monocrotophos	AZODRIN
Naled	BROMEX, DIBROM
Oxydemeton-methyl	METASYSTOX R
Parathion	PARATHION, PHOSKILL, NIRAN, THIOPHOS, PENNCAP E, Others
Phorate	THIMET
Phosmet	IMIDAN
Phosphamidon	DIMECRON
Propargite	OMITE
Terbufos	COUNTER
Toxaphene	TOXAPHENE
Trichlorfon	DYLOX, PROXOL
FUNGICIDES	
Benomyl	BENLATE
Captafol	DIFOLATAN
Carboxin	VITAVAX
Captan	CAPTAN
Chlorothalonil	BRAVO
Copper hydroxide	KOCIDE
Hexachlorobenzene	HCB
Hexachlorophene	ISOBAC
Mancozeb	DITHANE M-45, MANZATE
Maneb	DITHANE
Maneb + captan	GRANOX
Mist-O-Matic	Seed dressing machine
Res-Q 100	MANEB, CAPTAN, HCB comb
Terrazole	TRUBAN, TERRAZOLE, TERRA-COAT
Thiabendazole	MERTECT
Thiram	ARASAN, others
Zineb	DITHANE, ZINEB, PARZATE, others

COMMON NAME	FAMILIAR TRADE NAME[a/]
OTHER PESTICIDES	
4-AP	AVITROL
Maleic Hydrazide	MH-30
Methiocarb	MESUROL
Paraquat	PARAQUAT CL

a/This cross reference is presented as a convenience to the reader and is not a complete list nor any endorsement of the particular trade name for the pesticide chemical. Trade names listed are those most commonly indicated by the farmers who returned the questionnaires. Most tables and references in the publication utilize common names for pesticide chemicals.

The State Is the Campus for Agricultural Research and Development



Ohio's major soil types and climatic conditions are represented at the Research Center's 12 locations

Research is conducted by 15 departments on more than 7000 acres at Center headquarters in Wooster, eight branches, Pomerene Forest Laboratory, North Appalachian Experimental Watershed, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 1953 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2053 acres

Jackson Branch, Jackson, Jackson County: 502 acres

Mahoning County Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Appalachian Experimental Watershed, Coshocton, Coshocton County: 1047 acres (Cooperative with Science and Education Administration/Agricultural Research, U. S. Dept. of Agriculture)

Northwestern Branch, Hoytville, Wood County: 247 acres

Pomerene Forest Laboratory, Coshocton County: 227 acres

Southern Branch, Ripley, Brown County: 275 acres

Vegetable Crops Branch, Fremont, Sandusky County: 105 acres

Western Branch, South Charleston, Clark County: 428 acres